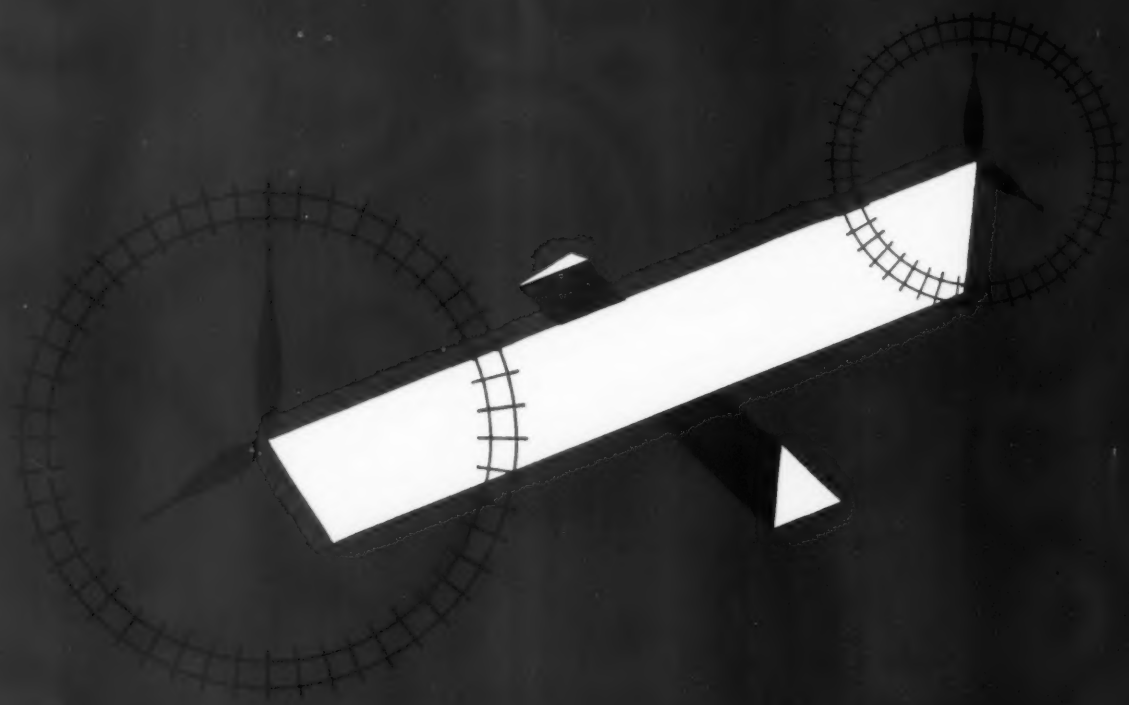
February 1934

RAILWAY TRACK and STRUCTURES

FORMERLY
Railway Engineering and Maintenance

Let Reliance HY-CROME Spring Washers help you



increase time between Track Joint Maintenance Periods

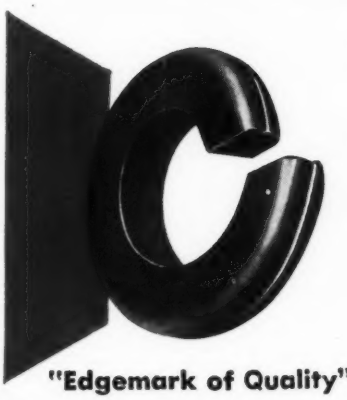
Lengthening the time between periodic tightening of rail joint bolts reduces the cost of maintaining track.

Reliance Hy-Crome Spring Washers are a product of the combined engineering experience of Eaton-Reliance fastening engineers, railroad track engineers and modern manufacturing methods.

To keep track joints tighter longer, a spring washer with adequate non-fatiguing reactive pressures had to be developed. Reliance Xtra-hy Hy-Crome Spring Washers were specifically developed to meet and exceed the 1948 A. R. E. A. Specifications.

Manufactured from special alloy spring steel of correctly engineered section sizes, their inherent reactive pressure over a wide reactive range is able to automatically compensate for developed looseness in the rail joint assembly and to keep it **tighter longer.**

A trial will convince you. Write now for Reliance Hy-Crome Spring Washer Folder R53.



"Edgemark of Quality"

RELIANCE DIVISION EATON MANUFACTURING COMPANY

OFFICE and PLANTS: 601 Charles Ave., SE, MASSILLON, OHIO

Special Steels · Spring Lock Washers · Hoz-Fas-Ners

SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

What makes the Model 53 so rugged?

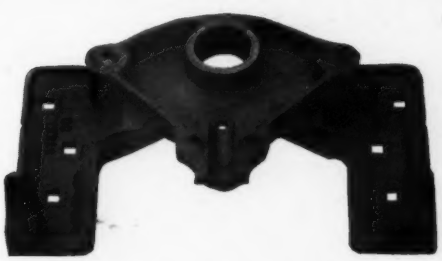
To be sure, anything made of steel is strong. So just what is so rugged about Bethlehem's Model 53 switch stand?

Well, let's take it apart and see. First, lift off the top housing and inspect the spindle. Notice how husky this heat-treated steel forging is, and how heavy the beveled collar in which the sliding block moves. Far more than enough "guts" here to transmit turning-power to the crank, even with the heaviest switches.

Next, the sliding block: another heat-treated steel forging, precisely machined to slide smoothly in the groove. When it eventually wears down, just lift it out, rotate it 90 deg either way, replace it in the spindle—and you have the equivalent of a new sliding block.

The crank? It's forged and machined from alloy steel, then heat-treated for extra hardness. Unique among screweye cranks in that the threads are specially cut with rounded roots to prevent incipient cracks in the shank.

With all its extra strength, Model 53 is easy to operate, easy to maintain. Doesn't it deserve a job on your mainline and heavy yard turnouts? We'll be glad to arrange a demonstration; just call or write our nearest office.



The switch stand base is cast of tough malleable iron. Extra broad for added stability on the ties. Integrally-cast stops protect the feet of switchmen throwing the lever.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM SWITCH STANDS

Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, one year $2.00 (special rate to railroad employees only, one year $1.50). Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Bristol, Conn. Volume 50, No. 2

Electric Earthmover Controls

Power from here to here

instantly – without wear – without adjustments

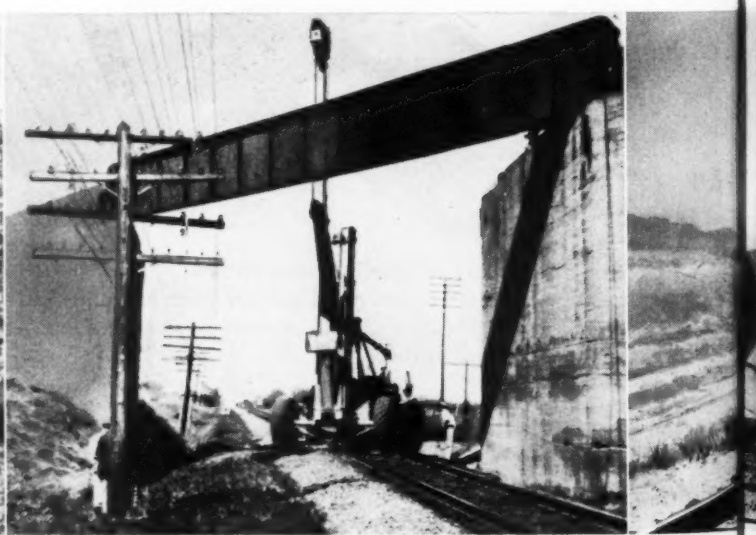
Once you see its split-second response, you'll *know* why LeTourneau-Westinghouse electric control has a reputation for being the fastest, safest, most practical control system for earthmovers ever built. With Tournapull, Tournatractor, or Tournacrane, there are no long levers or clumsy steering controls to fight. A fingertip switch controls every operation of these machines except braking (air) and accelerating. Every operation is instant, accurate.

EASY TO MAINTAIN

Operating records prove electric controls not only are fast, but need *far less* upkeep than either hydraulic or mechanical

D Tournapull: self-loads up to 7 yds., travels anywhere 28 mph

Ideal for off-track maintenance. Prepares new roadbeds . . . ballasts . . . repairs washouts, etc. No interruption to train schedules . . . unit drives to side of track, returns to work as soon as train passes. Handy 1-yd. bulldozer blade eliminates need for tractor on many jobs.



Tournacrane: interchangeable with scraper lifts 10 tons to 35 ft., carries full load

Raises, lowers loads smoothly, without the jars and jolts of clutch cranes. Provides power up, power down. Boom reaches into box cars, lifts horizontally . . . retracts to carry full load anywhere with close hitch to rigid-type boom. Needs no outriggers. All functions controlled electrically from cab.

speed rail maintenance

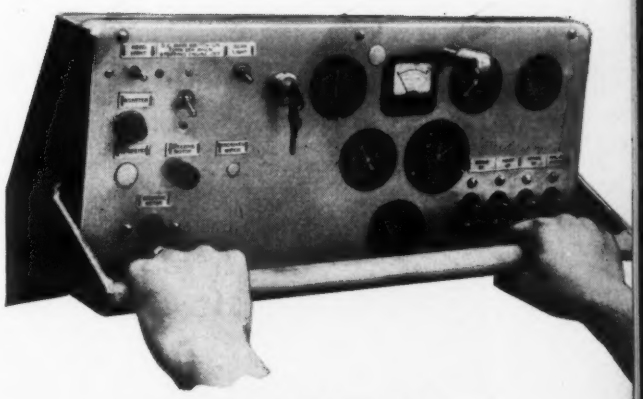
systems. The reason: motors work at point of action . . . do away with long cables, hydraulic lines, control clutches, complicated transmission linkages, control adjustments. Power is transmitted instantly along heavy flexible electric cable. Motors have *no wearing parts* other than bearings. Built-in end bells dissipate heat and keep motor cool and clean. Years of service prove that these special LeTourneau-Westinghouse motors work at top efficiency in rain, dust, heat and cold, where hydraulic or mechanical or ordinary electric systems cause trouble and often fail.

The a-c generator that supplies the power is equally simple. Coupled direct to the engine flywheel, it has no chain, belt, or gear drive to need attention . . . no commutator to foul up and require cleaning or turning down. The LeTourneau-Westinghouse generator is simpler and requires less maintenance than that which supplies current for lights and ignition on your car, truck, or tractor.

GET ALL THE FACTS

Important as it is, electric control is *only one* of the places where LeTourneau-Westinghouse units simplify your rail maintenance problems. Rubber tires, for example, give you 2 to 3 times the speed of tracks — yet eliminate about 500 wearing parts of the track assembly. And, with rubber-tired off-track equipment, units go anywhere — with no delays for loading, unloading or planking . . . travel cross-country, on highways or along right-of-way.

Compare these units with your present off-track equipment. You'll find that rubber tires and electric controls go hand-in-hand to give you superior performance at lowest cost. Contact us at LeTourneau-Westinghouse, and let us arrange a demonstration on your line.



Instant fingertip control

To steer, load, lift, spread or doze with Tournapull, you just flick one of these fingertip switches. Action stops automatically the instant switch is released or limit of travel reached. Because control is so easy, operator works faster, more accurately . . . with less end-of-day fatigue.

Point-of-action power

Individual motors put power where it's needed. Complicated mechanical or hydraulic systems are eliminated. Power located at point of action allows use of shorter cable lengths. Less reeving time is involved. Cable life is many times greater. Entire electrical system is simple to understand . . . as reliable as your refrigerator or other electrical home appliance.

Top performance in any weather

Electric motor dependability shows up best in tough going. Rain or snow have no effect — motors can operate even when under water. Dust and dirt blow right through. No precautions needed for freezing weather. Motors have no brushes or commutator . . . no wearing parts other than bearings.

The recent purchase by Westinghouse Air Brake Company of the earthmoving and related business of R. G. LeTourneau, Inc., combines two firms which are world leaders in their respective fields. It brings together the earthmoving know-how of LeTourneau and the practical railroad and precision manufacturing experience plus the great resources and research facilities of Westinghouse Air Brake. You can now buy our faster more economical off-track work equipment with even greater confidence than before.

Tournapull, Tournacrane—Trademark Reg. U.S. Pat. Off.
Tournatractor—Trademark M-178-RR

Tournatractor: 186 hp, 19 mph tractor for all pulling, pushing jobs

Electricity controls steer, shift, blade, operates double-drum PCU. Optional down-pressure attachment eliminates "washboard" cuts. Like all other LeTourneau-Westinghouse units, Tournatractor supplies emergency 120 volt current. Top travel speed is 19 mph.

SEND NOW TO

LeTOURNEAU-WESTINGHOUSE COMPANY

Peoria, Illinois

Tell us more about: ☐ 7-yd., 122 hp D Tournapull
☐ 10-ton Tournacrane
☐ 186 hp Tournatractor

Name _____ Title _____

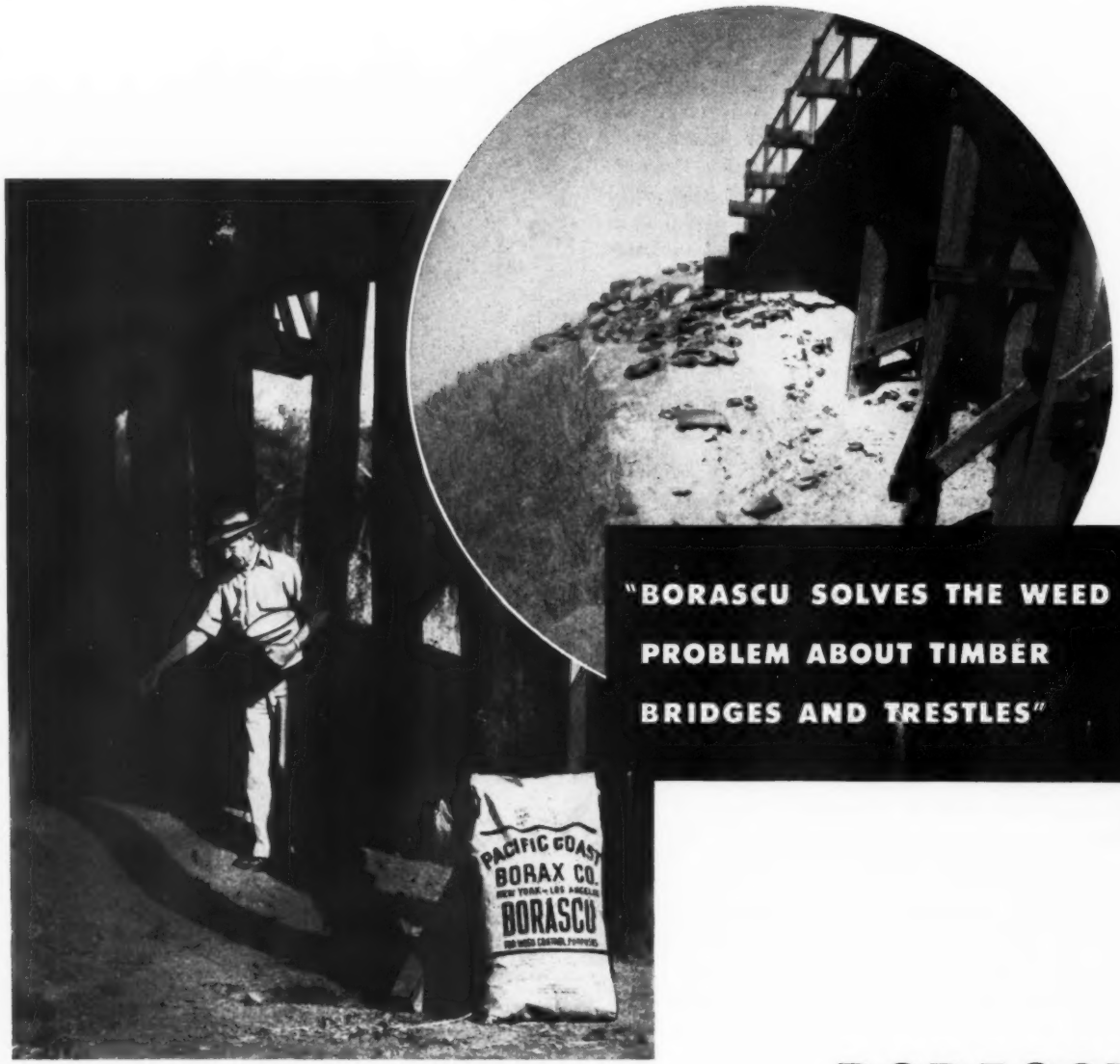
Company _____

Street _____

City _____ State _____

☐ Would like demonstration on our line.

M-178-RR



Don't Waste Your Manpower on Weeds!...Switch to BORASCU® WEED KILLER

You are looking at a trestle area treated with Borascu Weed Killer about two years earlier . . . *but fire-hazardous vegetation couldn't come back!* Lasting results . . . important savings . . . that's why more than thirty railroads are using Borascu. You can see another reason, too; it is the ease and simplicity of application! Section hands do the work in short order; nothing to mix, no costly hauling of water nor tieing up tracks with expensive on-track equipment . . . just a man, a pail and Borascu applied dry . . . from easily disposable 100-lb. multi-wall paper sacks. Yes, here is an effective low-cost weed killer you may use safely about timber trestles, tie piles, and congested classification yards, with the utmost economy. Borascu is nonflammable, noncorrosive, to ferrous metals, nonpoisonous to livestock . . . yet it is capable of destroying nearly all forms of vegetation! See Borascu kill weeds on *your* road, under *your* conditions . . . ask us to demonstrate without any charge or obligation.

Weed Control Dept. Representatives located in:
CHICAGO • NEW YORK CITY • NEW ORLEANS • SEATTLE • PORTLAND, ORE. • CLEVELAND, OHIO • AUBURN, ALA. • KANSAS CITY, MO. • HOUSTON, TEXAS • FT. WORTH, TEXAS • AMARILLO, TEXAS • BOZEMAN, MONTANA • MINNEAPOLIS, MINN. • SAN FRANCISCO, CALIFORNIA

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
630 SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

7,000,000 YARDS

MOVED *on Rock Island's Atlantic cut-off*

Typical terrain on the route of the cut-off. Cuts up to 70 feet deep were common and mud made earthmoving difficult.

In September, 1953, the final spike was driven on the Atlantic-Council Bluffs cut-off of the Rock Island Lines. The new route was originally recommended by General Grenville M. Dodge in 1857, but because of the immense cut-and-fill operations involved, the task had to wait for modern earthmoving machines.

The new line goes across the rough terrain of western Iowa, cutting off more than 10 miles of distance and reducing curves and grades. Cuts up to 70 feet were made through hills to fill adjacent valleys.

In completing the contract, 7,000,000 cubic yards of earth were moved, much of it dead mud that made scraper loading almost impossible. But Cat* DW21 and DW20 Tractors and Scrapers did the job, with D8s as pushers. There were 42 Caterpillar units on the job and not one of them averaged less than 300 hours of work per month, despite the tough conditions. In the opinion of the contractor, Orville Eblen Construction Co., "No other machinery built could have made such a record on this particular job."

The Atlantic cut-off has been an expensive undertaking but it should well repay the Rock Island Lines. Faster schedules and lower hauling costs will directly benefit the railroad, shippers and the traveling public.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

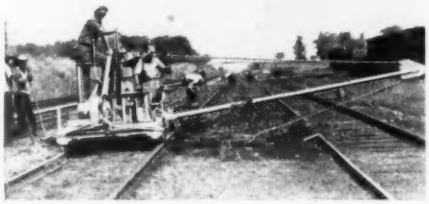
*Both Cat and Caterpillar are registered trademarks—®

THE NORDBERG "GANDY"

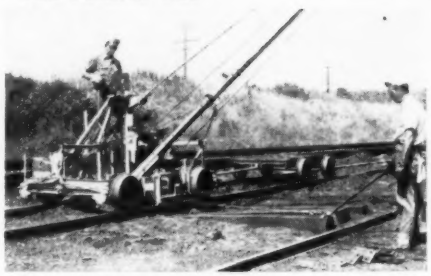
SAVES TIME – CUTS COSTS ON 3 DIFFERENT OPERATIONS*

The Nordberg GANDY—one of the latest developments for better, faster maintenance at lower cost—is a triple-purpose machine: (1) TIE PULLER: (2) TIE INSERTER: and (3) MATERIAL HANDLING CRANE. The Gandy is designed to perform these functions primarily in connection with out-of-face raising and tie renewal. It is used to pull out old ties, pull in new ties, pile or load old ties, set machines on or off the track, and distribute new ties, including hauling them to the work location. Two men operate the Gandy which, because of its "mechanical muscles", removes the physical labor from each job and makes possible uniform production all day long.

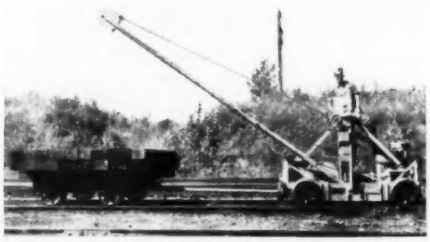
The Gandy is mounted on four 16″ flanged wheels. A 5 HP air-cooled gasoline engine with hydraulic coupling drives the propulsion mechanism and a winch. It is self propelled in either direction at speeds up to 12 mph. The frame carries a 17 ft. telescoping boom which is raised or lowered mechanically and swung manually in a 180° arc from a position over the center of the track in front, around to a position over the center of the track in the rear of the machine.



* FOR PULLING TIES



* FOR INSERTING TIES



* FOR MATERIAL HANDLING

For further details, write for Bulletin 201.

SPECIFICATIONS:

Weight—2300 lbs.
Boom length fully extended—17 ft.
Boom length fully telescoped—10 ft. 4 in.
Carrying capacity, full boom, no counterweight—400 lbs.
Carrying capacity, short boom and counterweight—1000 lbs.
Lifting capacity, clamped to track—2000 lb

R-153-R

USE NORDBERG "Mechanical Muscles"* TO DO A BETTER, FASTER MAINTENANCE JOB AT LOWER COST

*Trademark

ADZING MACHINE • BALLAST ROUTER • CRIBEX® • BALLASTEX® • SCREENEX® • HYDRAULIC & MECHANICAL SPIKE PULLERS • SPIKE HAMMER • TIE DRILL • POWER JACK • POWER WRENCH • RAIL DRILL • RAIL GRINDERS • TRACK SHIFTER • DSL YARD CLEANER • DUN-RITE GAGING MACHINE • GANDY—TIE PULLER and INSERTER

NORDBERG MFG. CO., *Milwaukee, Wis.*

NORDBERG MACHINERY

Here's Big News for YOU!....

Announcing MICHIGAN

TRACTOR SHOVELS

. . . from engine to tires Power Transmission engineered and manufactured by Clark

Faster, heavier, with more horsepower than any tractor shovels of comparable capacity, MICHIGAN* Tractor Shovels will move material faster, last longer, cost less to operate.

Clark Torque Converter
Clark Power-Shift Transmission
Clark Planetary-Wheel Axles
Hydraulic Steering Booster
Low Level Bucket Tip-Back
Short Turning Radius
High Tractive Ability
Four Speeds Forward
Four Speeds Reverse
Lights—Standard Equipment
Double-Acting Lifting and Dumping Cylinders
Gasoline or Diesel Engine

*Trademark of Clark Equipment Company

SIX MODELS . . . TO FIT EVERY NEED

Model 12-B—15 cu. ft.....bucket drive, rear steer
Model 75-B—1 cu. yd.....bucket drive, rear steer
Model 75-R—1 cu. yd.....rear drive, bucket steer
Model 75-A—1 cu. yd...all-wheel drive, rear steer
Model 125-A—1⅛ cu. yd..all-wheel drive, rear steer
Model 175-A—2¼ cu. yd..all-wheel drive, rear steer

For full information concerning these important new machines, send for the MICHIGAN Tractor Shovel FACT-FOLIO—a handy file of specifications and action photographs. The coupon will bring your copy.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
492, Second Street
Benton Harbor, Michigan, U.S.A.

Please send the MICHIGAN Tractor-Shovel FACT-FOLIO:

Name_____ Title_____

Firm Name_____

Address_____

City_____ Zone____ State_____

Low-cost, mobile, air power gives you extra hours of usage

Saves time and money on tie-tamping and many other M/W jobs

ONE man driving Tractair puts 105 cfm of air to work where and when you need it—lets you make more use of work-saving Le Roi-CLEVELAND air tools. On a tie-tamping project, for instance, Tractair delivers enough air to run eight standard Le Roi-CLEVELAND tie tampers.

And it can be equipped to give your men a hand—and cut costs—on other M/W jobs. With attachments, it lifts, loads, augers, mows, backfills, powers a winch, and does the work of other specialized equipment.

Tractair has good traction and low center of gravity. It goes almost anywhere, climbs embankments, works on a two-to-one slope with safety. Tractair also has high clearance. It readily crosses or straddles heavy-duty rail — it's ideal for use in multiple track territory.

The work-equipment officials of many roads can tell you that Tractair is truly invaluable the year around. See for yourself—ask us to show you Tractair at work. And — write for job-data sheets and bulletins.

Do all these jobs — and more — with TRACTAIR:

- Tamp ties; drive spikes.
- Break pavement.
- Drive mail point for grouting operation.
- Do ditching, light grading, weed mowing.
- Drive earth augers.
- Stockpile ballast, cinders, other materials.
- Handle off-season work for B&B, Signal, T&T, and Water-Service Departments.

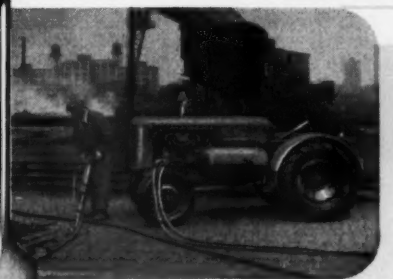
Le Roi-CLEVELAND No. 10 Tie Tamper, shown at left, weighs only 36 lbs. Section hands can keep up with the high-speed blows without tiring. The work is faster and more uniform.

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.
Railroad Sales Department
327 South La Salle Street • Chicago 4, Illinois

This Le Roi Airmaster Compressor is one of a complete line of portable, heavy-duty gas and diesel air compressors ranging from 60 cfm to 600 cfm. Available in railcar and rubber-tired models.

With the snow-plow attachment, Tractair pays off-season dividends, clearing yards, sidings, loading tracks, access roads. Rotary-broom attachment is available also.



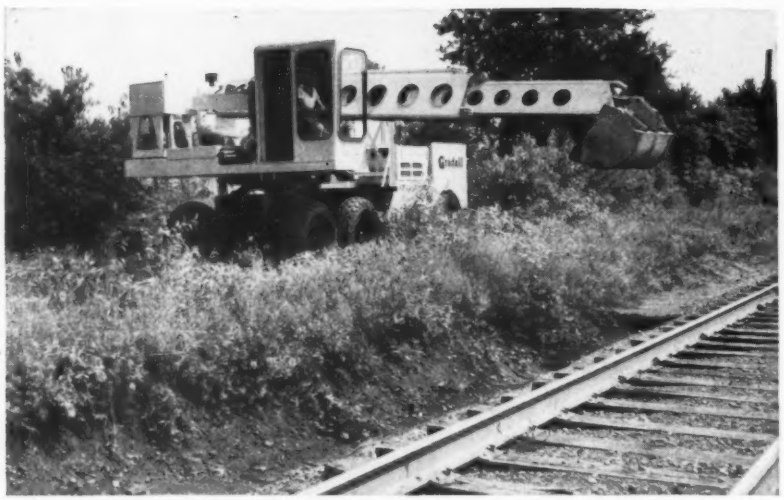
Here, Tractair runs a Le Roi-CLEVELAND Paving Breaker to repair a team track roadway. You can use Tractair to operate other Le Roi-CLEVELAND air tools, also.

HIGHBALL

off and on-track maintenance work with the new

RAILROAD GRADALL

New Gradall goes anywhere. With oversize tires and power steering it moves right over track, or over rough terrain.



Works off the track or on. *Gradall's hydraulic, telescoping boom reaches full 24 feet – 36 feet with boom extension* – for its precision work. Operator can even work to hand-finish "specs."*

Now one machine does all these jobs

- Cleaning tracks and roadbeds
- Trenching and Backfilling
- Maintaining drainage ditches
- Widening cuts and fills
- Ripping old pavement
- Sloping and Grading
- Excavating
- Laying rails
- Hand finishing

YES, the new railroad Gradall has *proved* it can do all these jobs—and many more—*faster, better, at less cost!*

This new multi-purpose machine is especially designed for railroads with oversize track-climbing tires, power steering, an extra-rigid H-beam frame, and remote control from operator's cab* for one-man operation.

It speeds jobs like track or ditch cleaning. One Gradall does them faster than a whole crew of hand laborers. It works off the track or right from the roadbed—moves off the track instantly, never interrupts traffic.

Gradall does the job better, too. Its telescoping *arm-action* boom gives the operator such complete control of the tool he can even work to hand-finish "specs."

And it moves fast from job to job—down the tracks or by highway. It covers every mile of your track—works in, or out of, places no other machine can reach. It doesn't require a work train.

This new Gradall pays for itself fast, too! A single investment gives you a machine that does the work of many. It's always busy—carrying its own quickly interchangeable attachments so it's always ready for the "next job."

But see for yourself. Write us to arrange a demonstration on your own work. Address: The Warner & Swasey Co., Gradall Division, Cleveland 3, Ohio.

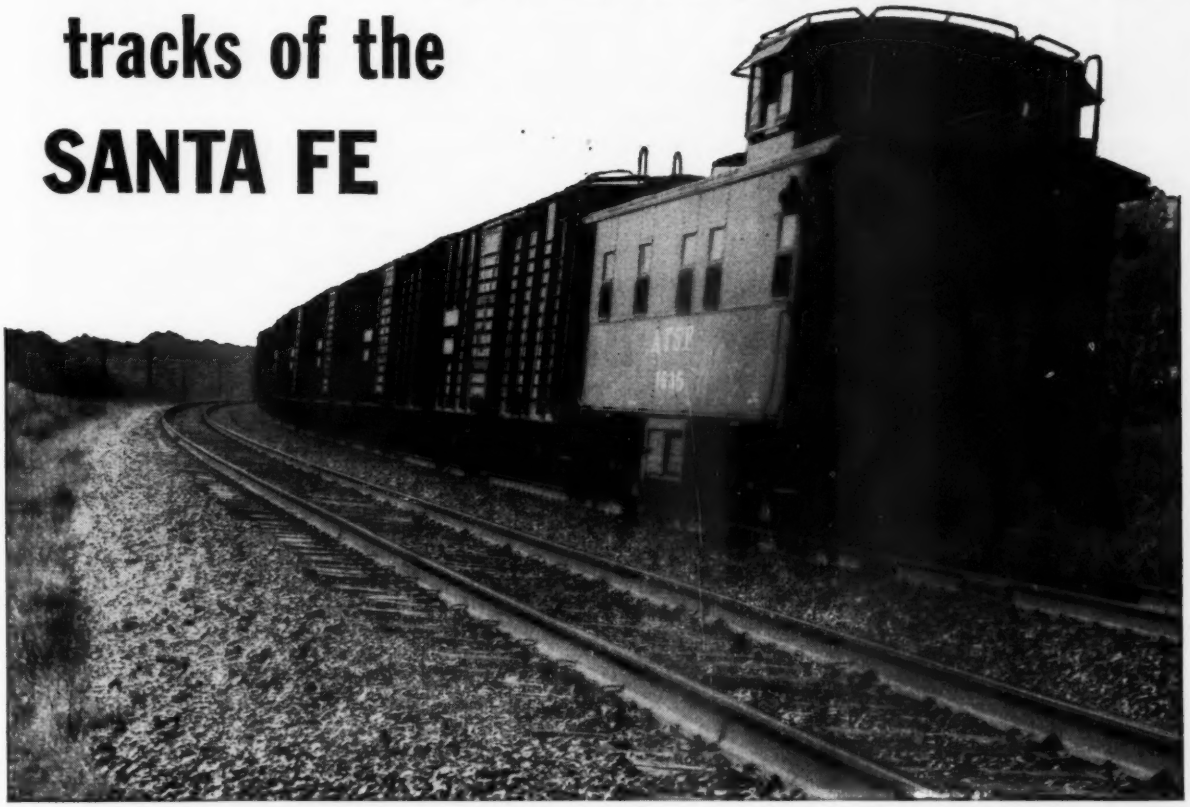
**Optional equipment.*

Gradall
DIVISION OF WARNER & SWASEY Cleveland
PRECISION MACHINERY SINCE 1880

Gradall Distributors in over 75 principal cities in the United States and Canada

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

Progress that *pays its own way* in the tracks of the SANTA FE



Continuous welded rail in main-line open track of the SANTA FE *near Florence, Kansas*

Since the inception of RIBBONRAIL Service, the SANTA FE has installed welded rail in each of the past 15 years. Rail for bridges, station platforms, tunnels, and open track has thousands of maintenance-free OXWELD pressure-welded joints.

During 1953 RIBBONRAIL Service on the SANTA FE was double that of 1952 and in 1954 it will reach a volume *five times* that of 1953!

Continuous rail on the SANTA FE for the future will be no longer measured in number of welds — it will be measured in track miles. This is a new phase in track engineering for America's new railroad—the SANTA FE.

One of the thousands of welded joints smoothing the tracks of the SANTA FE ▶

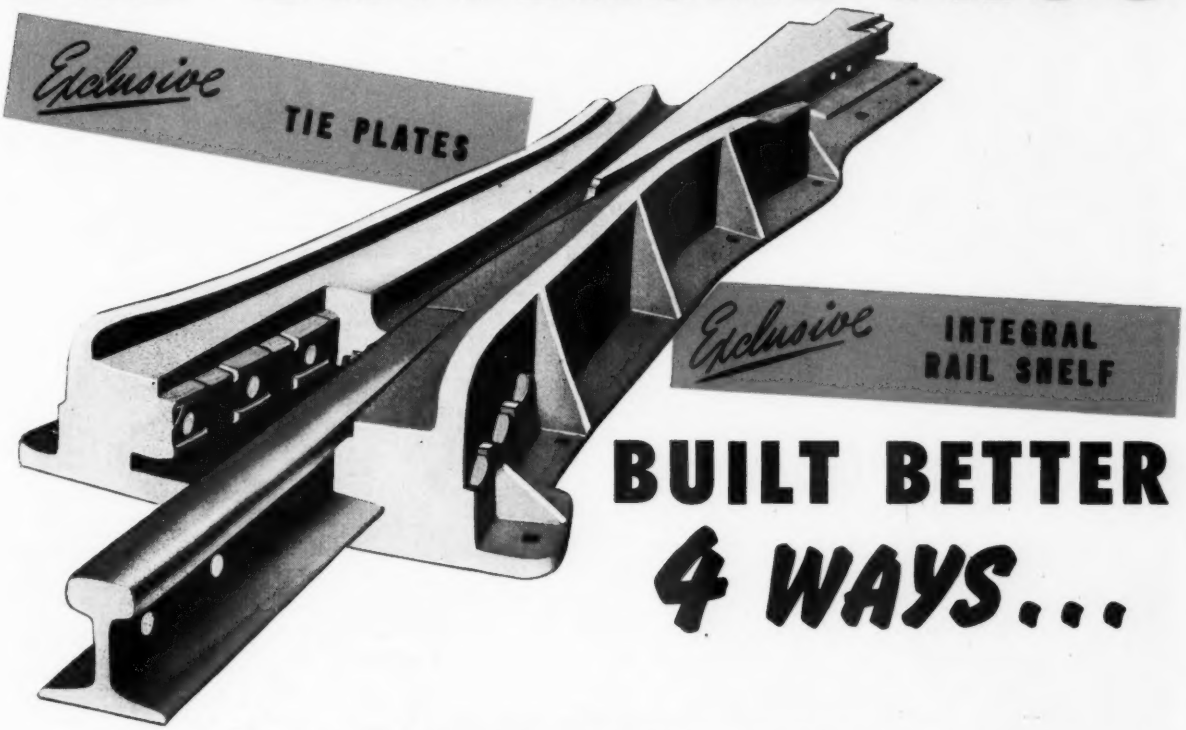
Ribbonrail
SERVICE MARK

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

OXWELD RAILROAD SERVICE

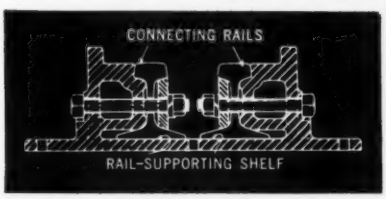
"Oxweld" is a trade-mark and "Ribbonrail" is a service-mark of Union Carbide and Carbon Corporation

THE UNIVERSAL FROG



BUILT BETTER 4 WAYS...

1. It is made of an alloy electric cast steel that adapts itself to low-cost electric or oxy-acetylene welding either in track or shop.
2. Tie plates are cast integral with the Universal Frog.
3. Rail supports are cast integral on both ends of Universal Frogs.
4. This one-piece construction gives you greater rigidity — no loose joints! You eliminate many extra parts and cut down on labor costs for maintenance crews.



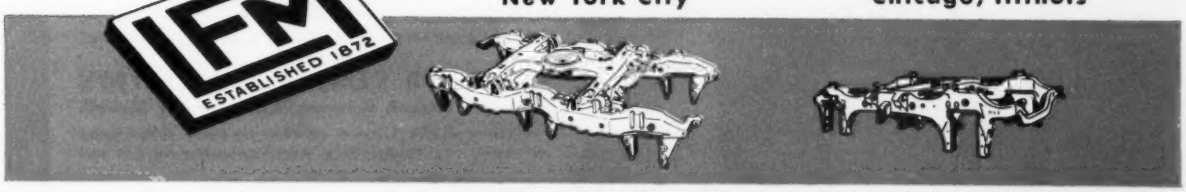
HERE'S THE PROOF!

Compare the cross sections above with conventional type built-up frogs. Note the improved type connecting rail joint, patented supporting shelf, integral tie plates and rib construction.

THE LOCOMOTIVE FINISHED MATERIAL CO.

ATCHISON, KANSAS . . . *Main Offices and Plant*
New York City **Chicago, Illinois**

LFM ESTABLISHED 1872



DIESEL LOCOMOTIVE ONE PIECE TRUCK FRAMES

FOR OVER 80 YEARS A MAJOR SOURCE OF SUPPLY FOR RAILROAD CASTINGS

One of the 160 Uses of CONCRETE on Railroads

NO. 17 OF A SERIES

This concrete supported railway track in the Atlantic Coast Line's passenger yard at Florence, S.C., is an excellent example of the use of concrete to solve a serious problem. This installation eliminated an unsanitary condition, ended costly maintenance and greatly improved drainage in the yard.

Concrete support for track is just one of more than 160 uses for concrete which enable railroads to improve service and save time and money. The moderate first cost, long life and low maintenance cost of such improvements result in ***low-annual-cost*** service. This saves money for other necessary items.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois

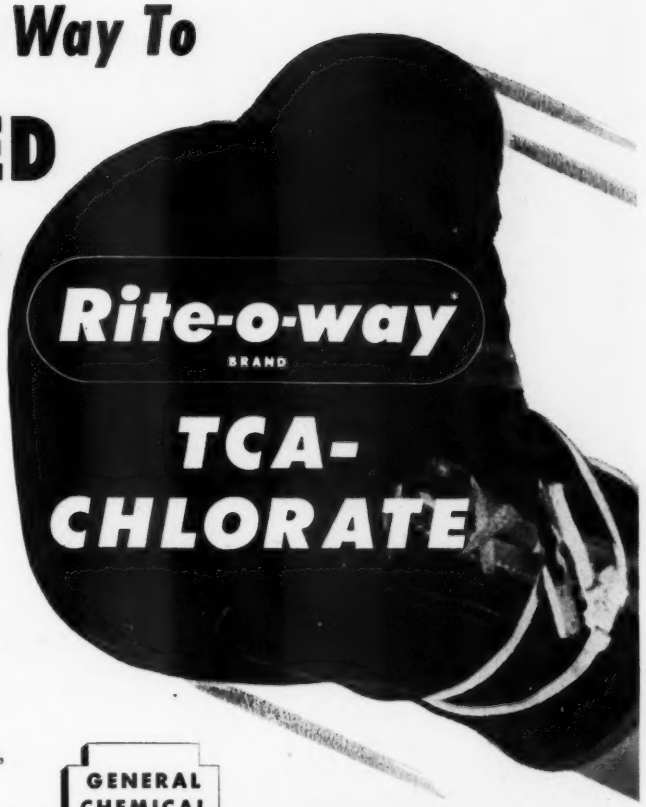
A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

NOW—*A Two-Fisted Way To*

K.O. YOUR WEED PROBLEMS

TCA-CHLORATE Liquid Concentrate in Tank Car Lots for Spray Train Application.

General Chemical's "Rite-o-way" Brand TCA-CHLORATE is made especially for large-scale railroad weed control operations. This special high-strength formulation of sodium trichloroacetate and sodium chlorate is an outstanding all-purpose weed killer used on leading railroads. General Chemical's Railroad Weed Control Service will furnish you with a complete professionally-planned control program for using "Rite-o-way" TCA-CHLORATE and, if you desire, trained technical crews to do the spraying.



GENERAL CHEMICAL WEED CONTROL

"STA-KLOR" Spray Powder in 100-lb. Drums for Dry or Wet Application by your regular labor crews.

For those nuisance jobs of weed killing in terminal yards, rip tracks, storage yards, station curbs and driveways, switches, ladder tracks and many more. "STA-KLOR" is the same powerful herbicide as "Rite-o-way" TCA-CHLORATE, a high-strength formulation of sodium trichloroacetate and sodium chlorate. A convenient spray powder—it can be used both as a dust and a spray. Handy 100-lb. drums; can be applied by your regular labor crews.

Handle the big job with "Rite-o-way" TCA-CHLORATE, the nuisance jobs with "Rite-o-way" "STA-KLOR." They perform equally well because they are the same high-power chemical formulation—designed to give rapid kill to surface vegetation and underground root runners, and to suppress seed germination for months at a time.

For further information write to . . .

Weed Killer Department

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

GC Allied Chemical

NEWS NOTES...

FEBRUARY, 1954

...a resumé of current events throughout the railroad world

Freight car loadings in the first quarter of 1954 are expected to be 1.4 per cent below those in the same period of 1953, according to estimates of the 13 regional Shippers Advisory Boards. It is expected that loadings in the first quarter will amount to 6,561,552 cars, compared with actual loadings of 6,657,179 cars in the corresponding period of 1953.

•

In 1953 the Class I railroads loaded a total of 38,302,762 cars of revenue freight, a decrease of 317,607 cars, or 0.8 per cent, compared with 1952.

•

A program of community relations, launched experimentally by the Eastern Railroads Presidents' Conference last fall is being expanded. Railroad community committees, designed to improve the industry's public relations at the grass-roots level, will be formed in Toledo, Ohio; Ft. Wayne, Ind.; Albany, N. Y. and Rochester; and Allentown, Pa.

•

All private and for-hire truckers performed about 200 billion ton miles of intercity service in 1953, according to the American Trucking Association. This was an increase of approximately 16 billion ton miles above the 1952 performance.

•

A spokesman for the Greyhound Corporation has stated that, of all the recent developments in the railroad passenger field, he looks upon the new design of the Talgo train by American Car & Foundry "with the greatest fear." Citing the train's low gross weight per passenger seat, he said, "we would breathe much easier if we felt certain nobody would buy them."

•

The Canadian Pacific and the Canadian National have extended their "trailers-on-flats" freight service to include the handling of truck-load consignments between Montreal and Toronto. In the new loading arrangements, freight in lots of 6000 lbs. or more will be handled in railway-operated trailers which will be carried on specially equipped cars in fast freight-train service between the two cities.

•

A "national transportation center" has been established at Northwestern University. The center will carry on a program of research, and of undergraduate and graduate training in major problems affecting all forms of transportation.

•

The Union Pacific will acquire 205 locomotive units from the Electro-Motive Division of General Motors Corporation. The total cost of the order is $35,769,410. Delivery, expected to be completed by June of this year, will completely dieselize the UP's through main-line services from Omaha to the Pacific Coast, except to the extent that gas turbine-electric locomotives may be used.

The driving practices revealed by an inquiry into a motor-carrier accident involving a vehicle loaded with explosives were "indefensible, particularly in view of the dangerous nature of the traffic transported," according to a report by the Interstate Commerce Commission. The report dealt with an accident involving a rear-end collision of the vehicle carrying explosives with a private automobile. The investigation revealed that the driver of the truck had been arrested twice in 1953 for speeding and that he had not made the written vehicle condition reports required by commission regulations.

•

The need for rates that will truly reflect the inherent advantages of each major agency of transportation underscores the whole problem of preserving and developing the country's common carrier system, according to statements made in an address by Charles L. Dearing, deputy under secretary of commerce for transportation. Among other proposals Mr. Dearing recommended that common carriers be allowed sufficient managerial discretion to permit prompt adjustment of pricing policies to cost changes and other competitive circumstances.

•

RESULTS OF LABOR NEGOTIATIONS—Practically all of the unions representing railway employees are now engaged in negotiations to obtain increases in pay or other benefits, or have recently come to agreements with the railroads. As of the time of going to press the status of the negotiations involving various groups was as follows:

NON-OPERATING UNIONS—These groups have demanded a variety of health-welfare and other fringe benefits. Wages are not an issue. Because of a threatened strike of these unions President Eisenhower has created an emergency board to hear the two sides.

SWITCHMEN—Negotiations are continuing on the demand of the switchmen for an increase of 40 cents an hour and other benefits. A carrier-proposed settlement involving an increase of 13 cents hourly accumulated under the escalator clause, plus 5 cents more, has been rejected.

TRAINMEN—Negotiations on the demands of this union were terminated on December 17 by an agreement which adds 5 cents an hour to present wage rates. This is in addition to increases totaling 13 cents an hour resulting from the escalator clause.

LOCOMOTIVE FIREMEN AND ENGINEMEN—An agreement has been reached on a basis essentially similar to that previously negotiated with the trainmen.

DISPATCHERS—These employees obtained a wage increase of $8 per month, retroactive to December 1, 1952, as a result of an agreement reached at Chicago on November 5.

CONDUCTORS—A dispute over a demand for graduated rates of pay based on the weight on drivers of the locomotives hauling passenger trains is in the hands of the National Mediation Board.

First year's savings can repay your investment in A. O. Smith D.C. Rectifier welders that replace motor-generator sets. **44% more efficient** in operation than heavy rotary equipment! **End costly maintenance** . . . add the benefits of better, smoother, faster welding at much less cost.

A.O.Smith

D. C. RECTIFIER WELDER

1. Rectifier stacks are cooled by fresh air drawn in at the top by 2. Life-time industrial fan, which then blasts air down over 3. Heavy copper, fibrous glass-insulated transformer coils. 4. Primary coils move up or down for current setting on ball-bearing jacks under stepless, non-creep current control. An illuminated scale is easy to read. All parts are easily accessible for maintenance by removing a few screws and a panel of the 5. Attractive, restful-green, baked-on enameled steel case. 6. Eye-bolt for hoist and 7. Floor clearance for handling with fork-truck makes the A. O. Smith Rectifier portable.

Made by welders . . . for welders

Write Dept. RT-254 for complete details

A.O.Smith CORPORATION

Welding Products Division, Milwaukee 1, Wisconsin

International Division: Milwaukee 1, Wisconsin

A MASTERPIECE IN TRACKWORK MAINTENANCE

TRACK-TALK—Published every other month by Kershaw Manufacturing Co. Write for your free copy today.

But, unlike most recognized masterpieces, this one isn't at all expensive.

That's because the maintenance work done on the ballast shoulder and track shown above was done by the KERSHAW BALLAST REGULATOR AND SCARIFIER.

Kershaw equipment gives masterful performance—as has been proven on many of the nation's leading railroads.

Kershaw equipment gives economical performance—as has been reflected in cost figures which show substantial savings in maintenance.

Here's just one example:

Using the KERSHAW BALLAST REGULATOR AND SCARIFIER, you can maintain your ballast shoulder in the same top flight condition as the track shown above for ONLY $20 to $40 PER MILE, PER YEAR!

Other Kershaw equipment can produce just as good results at similar savings. The Jackall, Kershaw Kribber, Hydraulic Jack, Utility Derrick, Mocar Crane, Track Crane, Track Broom—all have proven their efficiency and economy on the nation's railroads.

They'll do a job to make you proud of your railroad and your railroad proud of you. At a substantial savings in cost, too!

KERSHAW

KERSHAW MANUFACTURING CO., INC., P. O. BOX 510, MONTGOMERY, ALA.

TRACKWORK EQUIPMENT DESIGNED, DEVELOPED AND PROVEN ON THE JOB

Research Proved
CHEMICALS
Plus
MODERN EQUIPMENT
Plus
SKILLED OPERATORS

...Add Up to Low Cost Per Mile

It's as simple as that—the Bogle formula for successful, *economical* weed and brush control. And it's working, judging from the number of repeat orders from roads with varying roadway problems.

Above is a typical scene of a Bogle spray train in action "gunning" a heavy growth of brush on the right of way of a prominent Southern road. The powerful jets completely saturate the growth to a distance of 100 ft. from the center of the track.

Plan now to keep ahead of roadbed and roadway growth the tested, time-tried Bogle way. We shall be glad to sit down with you and work out a program.

The R. H. BOGLE Company

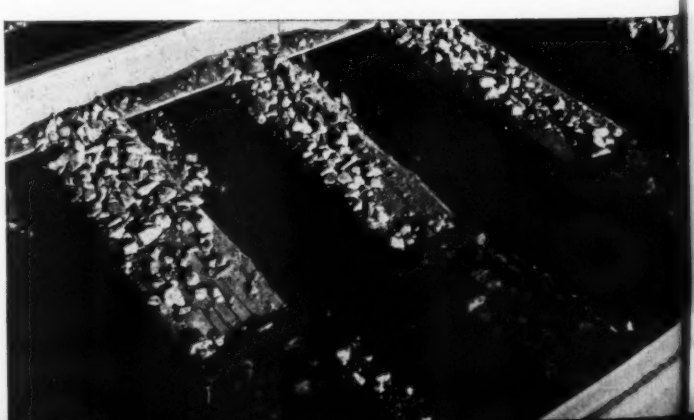
ALEXANDRIA, VA.

Memphis, Tenn.

COMPLETE WEED and BRUSH KILLING SERVICE

THE POWER TRACK CRIBBER

Two cribs a minute! Just a single operator! This is what you can expect from the Pullman-Standard Power Track Cribber. And this is how one railroad saved $86,232 during the 1952 work season. Powered by a 100 hp. gasoline or Diesel engine, the Cribber travels to and from location at a speed of 25 mph. Power-operated jacks and transverse wheels permit complete set-off in three to five minutes. With a normal production rate of 100 to 225 track-feet an hour, its interchangeable 4-, 5-, and 6-inch digger tips enable it to crib efficiently and economically in any type of ballast regardless of cementation.



TRACK CRIBBED UP TO THE "PULLMAN" STANDARD

Track cribbed up to the "Pullman" standard! The 7,200 lb. drop-head of the Cribber drives its digger bars into the crib and cam action forces them outward to loosen the ballast and clean the crib. For proper drainage, the Cribber cuts a uniform sloping profile level with the tie base at track center and 3½" lower at the tie ends. Digging depth can be controlled to meet varying rail height conditions and specified depths. Seldom limited by skewed ties, the machine is readily moved back and forth in the crib to permit thorough cleaning. Even if ballast is level with top of ties, it can put the cribbed ballast on the track shoulders for subsequent cleaning.

Savings-the mechanized way

MECHANIZED TRACK MAINTENANCE ASSURES DEPENDABLE WORK PERFORMANCE AT LOWER COSTS

While railroad income has risen steadily in the past few years, maintenance costs have gone up proportionately much higher.

Mechanized maintenance can reverse this trend and at the same time give you better, longer-lasting track. In the fight for operating economy, the Pullman-Standard Power Track Cribber has proved itself to be one of the best weapons in reducing today's costly labor requirements. For instance, it permits a single operator to crib 100 to 225 track-feet an hour, the equivalent of the work of several section gangs. In fact, one railroad reports the Power Cribber equals in one hour the whole day's work of five men... another, that one cribber saved $47,000 in out-of-pocket costs in just one work season.

But the Cribber is just one of the Pullman-Standard designed machines that *work* for the railroads—the Power Ballaster and the Power Ballast Cleaner-Winch Car team are engineered to cut maintenance costs and pay for themselves out of savings. If you want immediate operating economies and superior production results, get the facts on Pullman-Standard mechanized maintenance-of-way equipment by contacting our nearest office and asking a representative to call.

YOUR NEEDS CREATE THE PULLMAN "STANDARD"

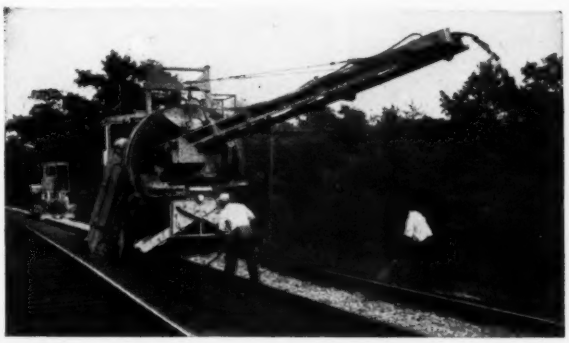
PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

79 EAST ADAMS STREET, CHICAGO 3, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO • THE HOLDEN CO., LTD., MONCTON, MONTREAL, TORONTO, WINNIPEG, VANCOUVER



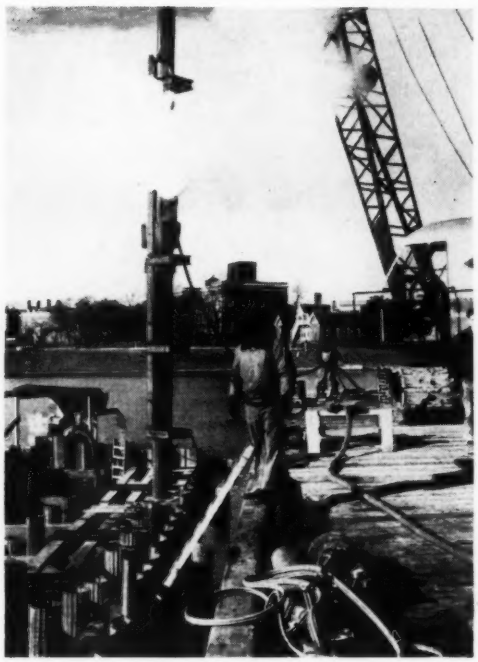
THE POWER BALLAST CLEANER AND WINCH CAR TEAM

For the first time both track shoulders can be cleaned simultaneously at 1000 to 1200 feet an hour with only four men. Even in multiple track territory, the shoulder plus half the six-foot are cleaned to a depth of eight to ten inches below the tie base at the same high rate and with the same labor requirement. Winch Car develops 30,000 lbs. of tractive force.

THE POWER BALLASTER

$70,000 in out-of-pocket savings! This is what one railroad saved during the first year of Power Ballaster operation. With a production rate of 500 to 700 feet an hour, the Power Ballaster has the highest proved equipment availability of any other production tamper. It's designed to the "Pullman" standard for better work, more of it, and with less labor.

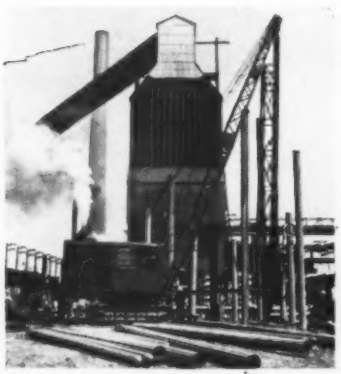
MONOTUBE PILES
for all types of structures



FOR small jobs . . . for the biggest or toughest jobs . . . you'll find Monotube fluted steel piles are more and more often the carefully considered choice for *all kinds* of foundation work.

There are good reasons for such choice—exceptional strength and high load bearing values, combined with light weight for easier handling and driving. Simplified on-the-job extendibility. Complete top-to-bottom visual inspection before concreting. Jobs go smoothly and fast! Less waste. Less time. Less cost!

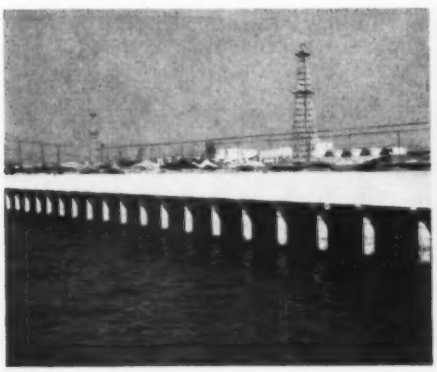
Get all the facts. Write to The Union Metal Manufacturing Co., Canton 5, Ohio, for Catalog No. 81.



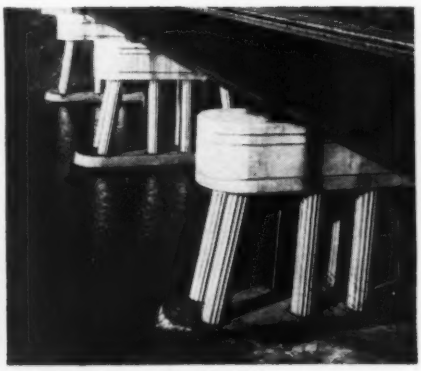
INDUSTRIAL PLANTS

BUILDINGS

BRIDGES



PIERS

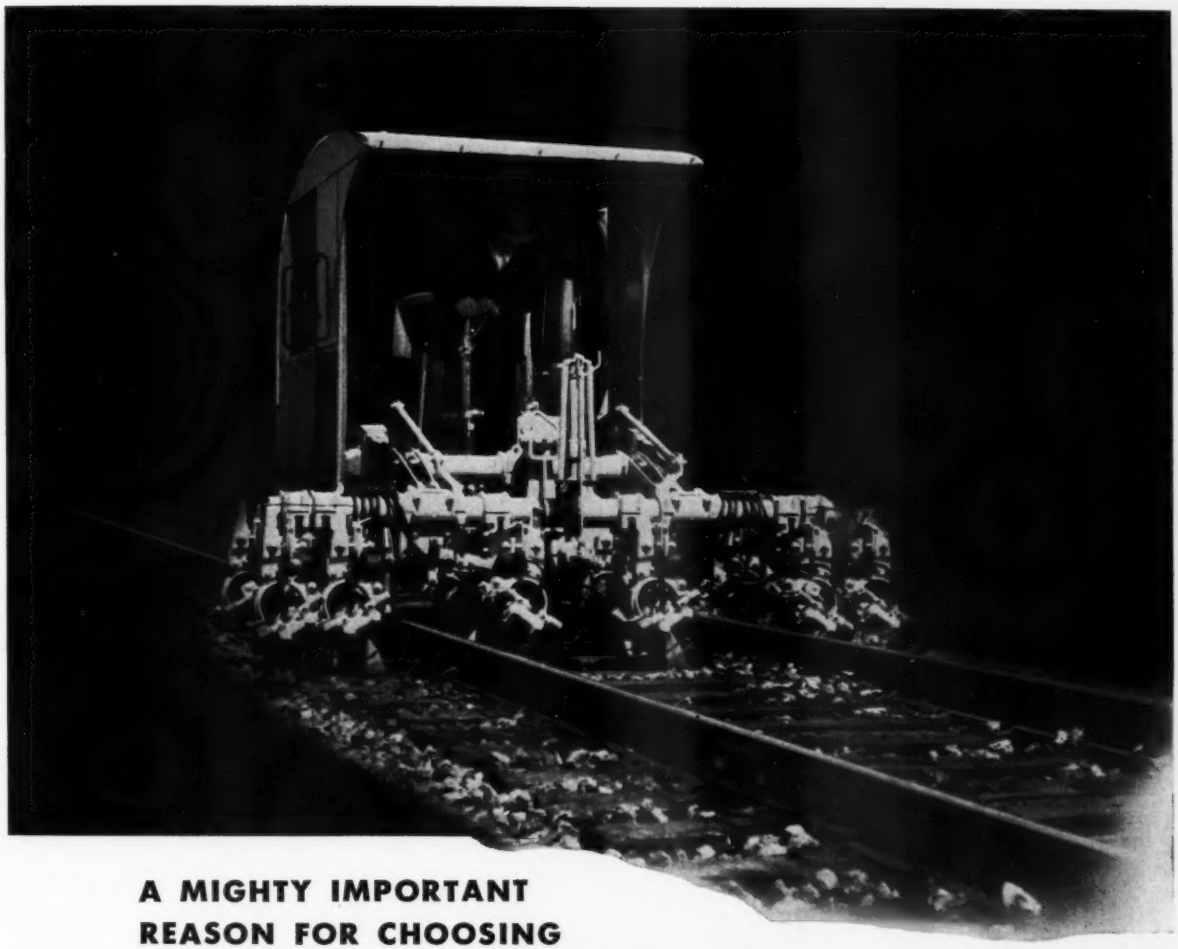


RAILROAD STRUCTURES

EXPRESSWAY OVERPASSES

UNION METAL

Monotube Foundation Piles for every foundation problem



A MIGHTY IMPORTANT REASON FOR CHOOSING

JACKSON MULTIPLE TAMPERS

Wherever a raise of track is involved, from that which is no lower than the average size of ballast used to the very highest lift, **JACKSON MULTIPLES will put up more and better track at less cost than can be done with any other on-track tamper** . . . the chief reason why more than 60 leading roads and contractors own and operate these machines in quantities. Write, wire or phone for complete details.

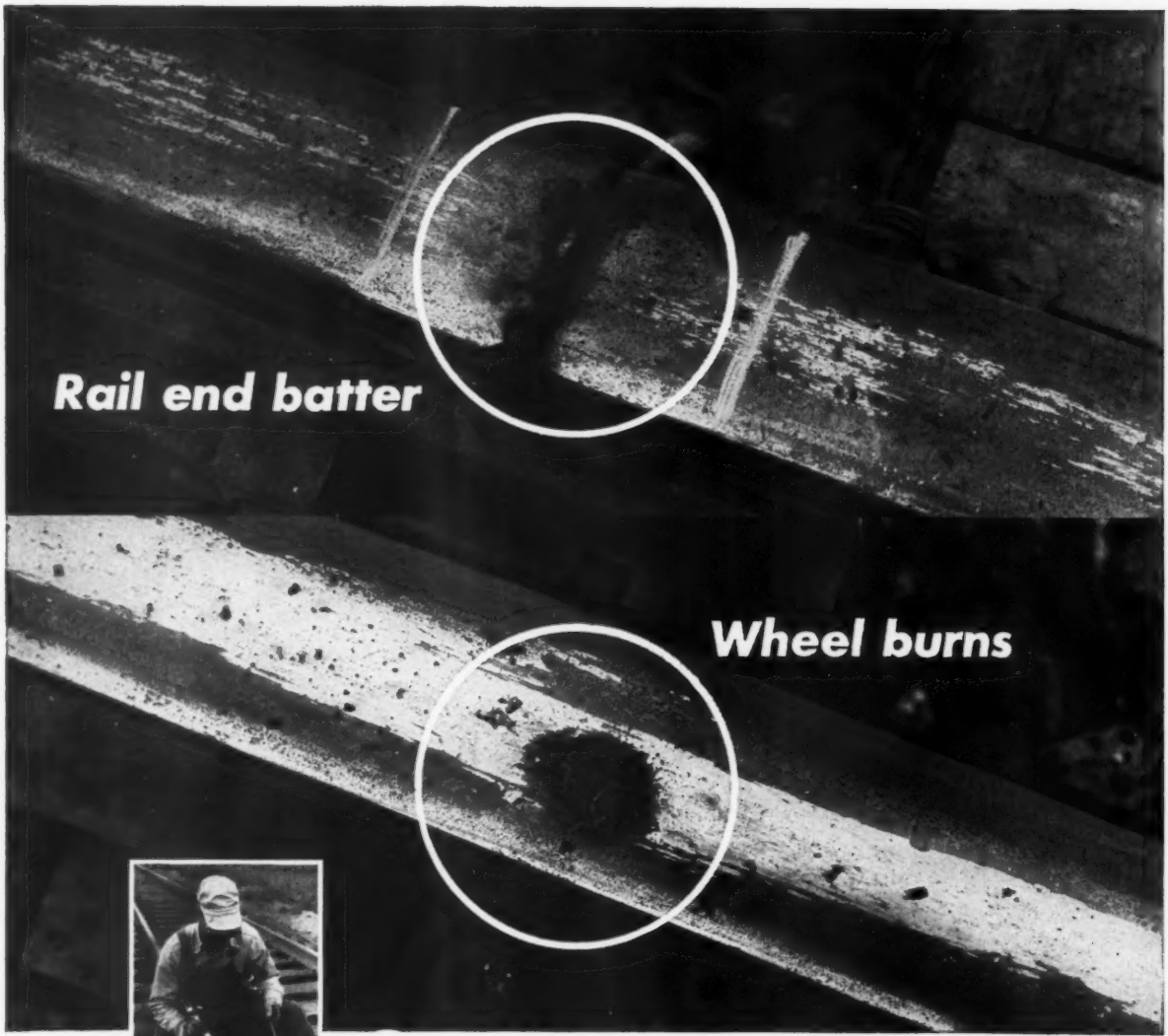
MFD. BY JACKSON VIBRATORS INC. LUDINGTON, MICH.

SOLD IN U.S.A. BY

ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON MICHIGAN

CANADIAN REPRESENTATIVES: MUMFORD, MEDLAND, LIMITED — WINNIPEG, MANITOBA



one rod for both

Airco Railroad Rod provides a single answer to these two common types of rail damage. You can use it to build up battered and chipped rail ends, or, by a simple adjustment of the welding torch's oxyacetylene flame, to fill in and smooth out rail burns. Hardness of the deposit is 251 to 350 Brinell—well within the required range for both applications. Airco Railroad Rod is standard on many major railroads, not only because it eases stocking problems but also because of the high quality of its deposit.

Your Airco railroad representative will be glad to arrange an actual demonstration. Why not get in touch with him today?

AIRCO®

OFFICES IN
MOST PRINCIPAL CITIES

AIR REDUCTION

60 East 42nd Street • New York 17, N. Y.

Air Reduction Sales Co. • Air Reduction Magnolia Co. • Air Reduction Pacific Co.
Represented Internationally by Airco Company International

Divisions of Air Reduction Company, Incorporated

at the frontiers of progress you'll find

AIR REDUCTION PRODUCT

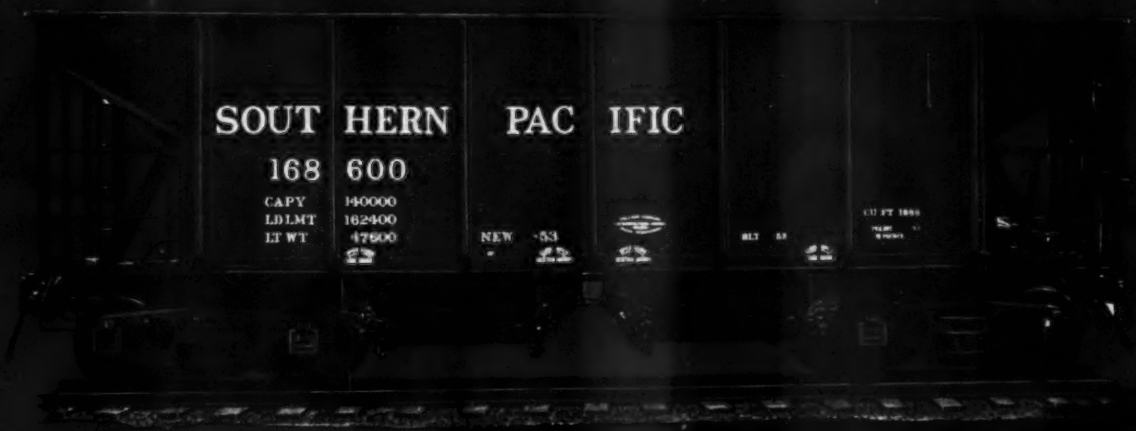
Southern Pacific Lines

The friendly Southern Pacific

Order . . . MULTI-SERVICE BALLAST CARS

equipped with

ENTERPRISE BALLASTING MECHANISM



70-ton Southern Pacific welded ballast car built by Pullman-Standard Car Manufacturing Company, Butler, Pa., equipped with ENTERPRISE ballasting mechanism

A-side Discharge Car
A Center Discharge Car
Operative Either or Both Sides Simultaneously

Door Operating Devices Exclusively Since 1906

ENTERPRISE RAILWAY EQUIPMENT COMPANY

General Offices: 565 Lake View Avenue, Chicago 14, Illinois

One Standard of Quality

DEMOUNTABLE STEEL WHEELS FOR EVERY TRACK CAR

Every Fairbanks-Morse demountable steel wheel conforms to one standard of quality — the highest!

Every step from sheet steel purchase to finished wheel is under Fairbanks-Morse control and inspection. Every wheel is cold-formed in our own plant, on our own presses using our own modern dies . . . machined and finished to a design of simplicity and strength.

This control of quality is your assurance that F-M wheels are the sturdiest track car wheels on the rails today!

When you need replacement wheels in 20", 16" or 14" sizes, standardize on quality . . . standardize on Fairbanks-Morse steel wheels for longer life. Fairbanks, Morse & Co., Chicago 5, Ill.

Conform strictly to A.R.E.A. standards

FAIRBANKS-MORSE

a name worth remembering when you want the best

RAIL CARS AND RAILROAD EQUIPMENT • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • HAMMER MILLS • MAGNETOS

RUST-OLEUM

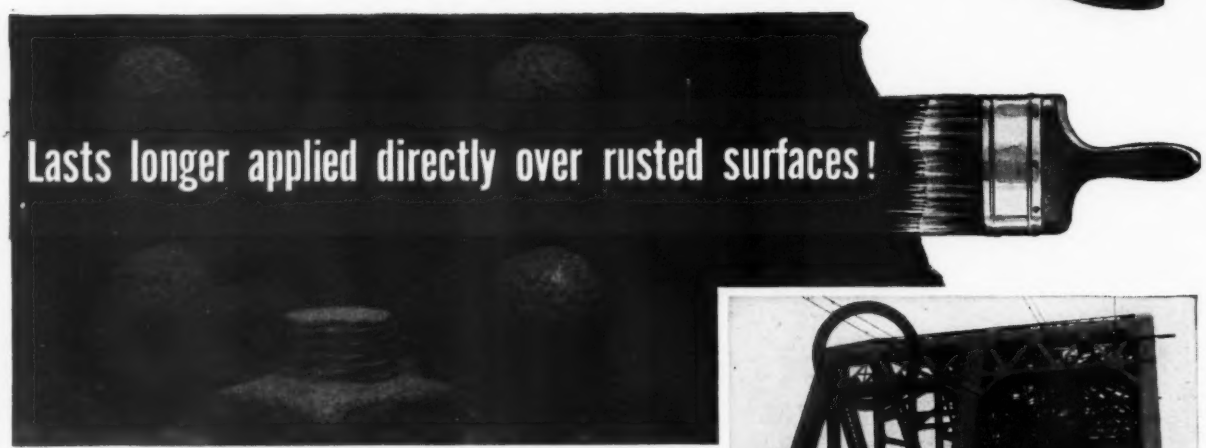
STOPS RUST!

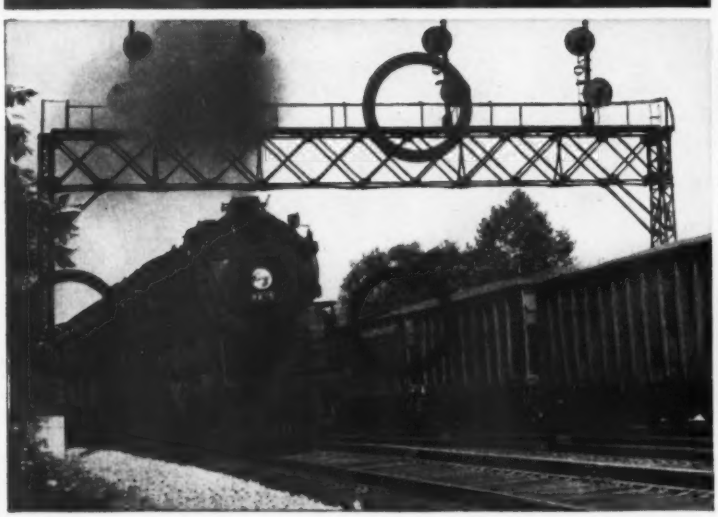
Cut Your Maintenance Costs On Signalling Equipment, Rolling Stock, Bridges, Towers, Tanks, etc.

Here's the *practical, sensible* answer to your rust problems! Costly sandblasting or chemical precleaning are not usually required . . . just wirebrush and scrape to remove rust scale and loose particles . . . then apply RUST-OLEUM by brush, dip, or spray over the rusted surface. Dries to a tough, elastic, rust-resisting film that lasts longer applied over rusted areas. So easy to use that one man often does the work of two . . . saves you time, labor, and money. Get the complete story from your RUST-OLEUM Rust Preventive Railroad Specialist today!

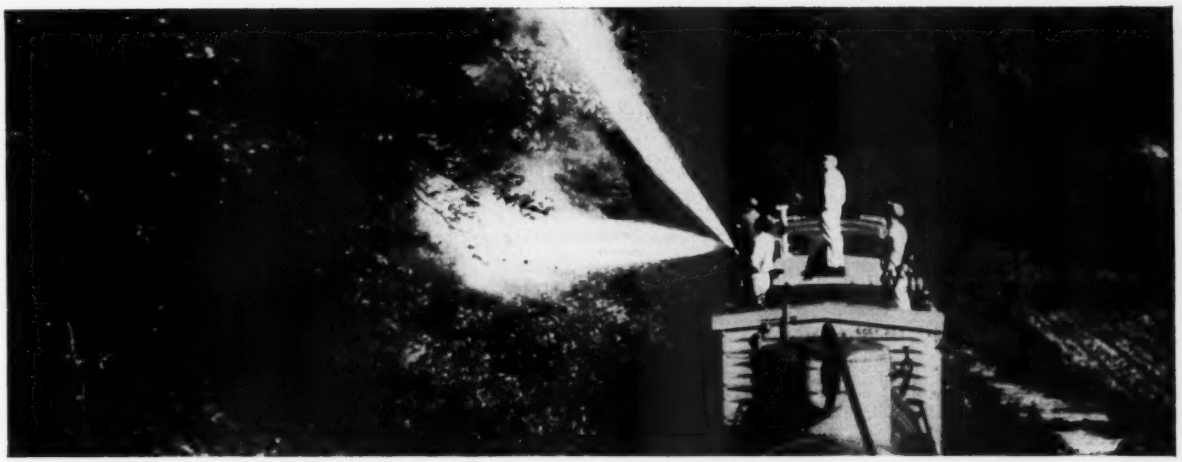
RUST-OLEUM CORPORATION
2546 Oakton Street, Evanston, Ill.

Available In All Colors, Aluminum and White





Request Your FREE Copy of The RUST-OLEUM Railroad Catalog Now!

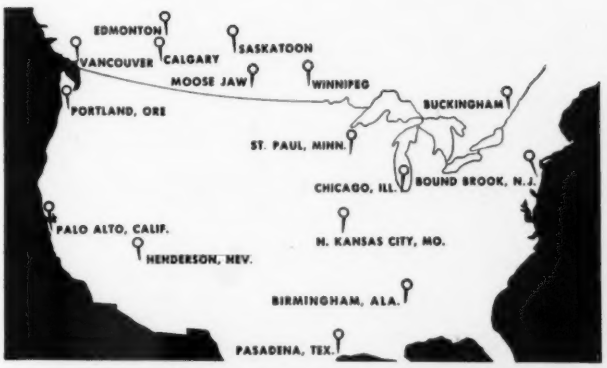


Weeds-Grass-Brush?

We can solve YOUR weed control problems with the RIGHT chemicals and application service

Our complete line of proven weed, grass and brush killing chemicals includes:

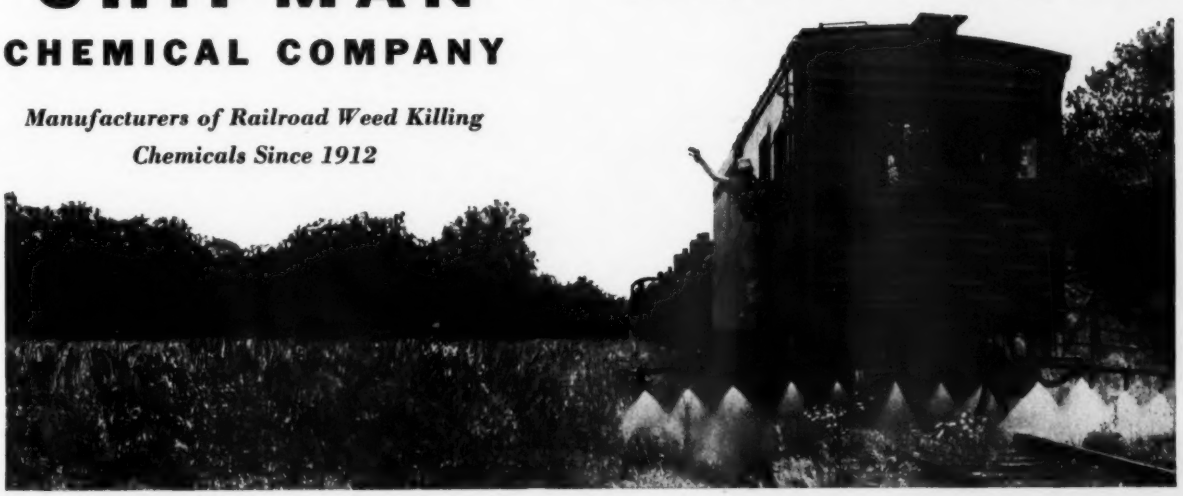
Atlacide Liquid	Methoxone-Chlorax
Atlacide Spray Powder	CMU
Chlorax Liquid	Brush Killer
Chlorax Spray Powder	Atlas Contact
TCA-Chlorax	Atlas "A" Arsenical



16 Strategically Located Chipman Plants

CHIPMAN
CHEMICAL COMPANY

Manufacturers of Railroad Weed Killing Chemicals Since 1912



No. 302 of u series

RAILWAY TRACK and STRUCTURES

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 WEST MONROE STREET
CHICAGO 3, ILL.

February 1, 1954

Subject: Reporting Changes in Personnel

Dear Readers:

Over the years some rather fundamental changes have been made in the content and appearance of the editorial section of this magazine. Several of the regular features, however, have remained practically unchanged. One of these is that section of "The Month's News" wherein we report appointments, promotions and deaths among supervisory personnel in the engineering and maintenance-of-way departments.

In these days, when all of us have grown accustomed to seeing the world around us undergoing fundamental changes almost daily, it is a novelty to find something that is about the same as it was yesterday or last year or 10 years ago. Therefore, we may well raise this question: Why do we continue to report changes in personnel in the same manner as we have for many years?

Let's consider the question from this angle. People have varying degrees of interest in different things or subjects. To stimulate their interest in matters toward which they have a lukewarm attitude it may be necessary to employ unusual measures. For instance, as a result of the many different diversions now available, such as television, magazines of all types have found it necessary to counter with measures to make their contents more interesting so that they will command the attention of the reader. That is why we, along with other magazines, are endeavoring to dramatize in various ways the material presented in the feature section.

We haven't felt that similar measures were necessary in reporting changes in personnel because we recognize that people, and what happens to them, make the most interesting news obtainable. We are certain that our readers, like all people, have an intense curiosity regarding happenings involving their associates and others in the same field of endeavor. Such news does not have to be "dressed up" in any way to make it palatable. Simple statements of fact reporting the essentials are all that is necessary.

Our concern is not with the method of reporting and presenting personnel changes but with the problem of assuring that you are given the most complete coverage of such changes of which we are capable. The large number of railroads to be "covered" and their widely scattered locations combine to make this a difficult problem. But we never permit ourselves to forget the necessity of exercising eternal care and vigilance in compiling information for you on what is happening to other people in your line of work.

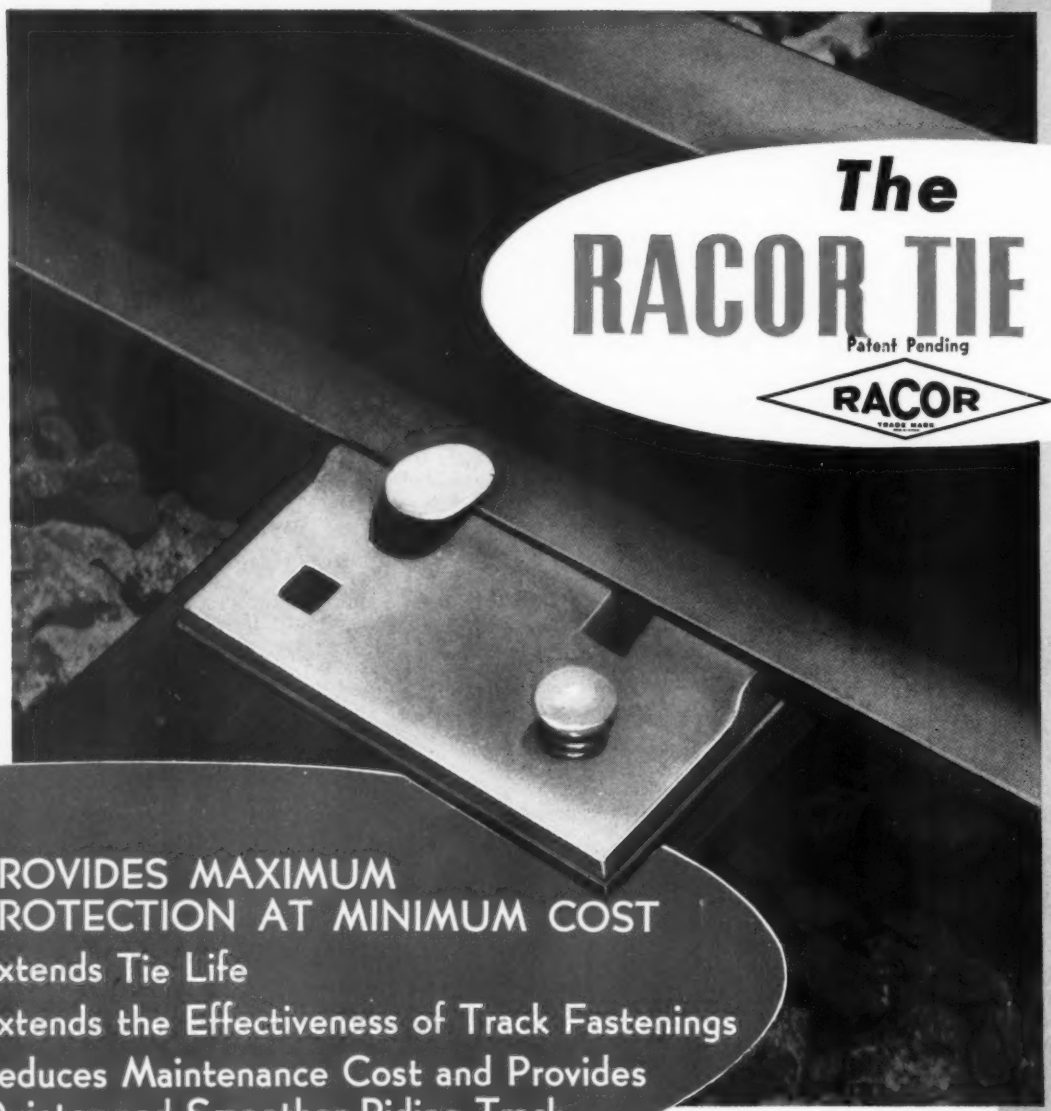
Yours sincerely,

Merwin H. Dick

Editor

MHD:lw

Members: Audit Bureau of Circulations and Associated Business Publications



The RACOR TIE PAD

Patent Pending

RACOR

PROVIDES MAXIMUM PROTECTION AT MINIMUM COST

Extends Tie Life

Extends the Effectiveness of Track Fastenings

Reduces Maintenance Cost and Provides Quieter and Smoother Riding Track

The RACOR TIE PAD is recommended for use in locations where severe tie wear prevails and is particularly economical when used on expensive railroad ties or bridge timbers. It is a rubber-fibre compound, molded under heat and pressure, possessing a high tensile strength and capable of maintaining its physical properties under heavy traffic loads — yet is sufficiently flexible to adapt itself to the irregular surfaces of ties. ALL RACOR TIE PADS are coated with a special sealing compound that seals the pad to the tie, providing maximum protection by preventing the entrance of moisture and abrasives that accelerate the early deterioration of the tie. A fungicide is also used in the manufacture of the RACOR pad that further retards this deterioration. Intensive research and many years of experience in manufacturing this type of product has given us the "know-how" to produce a material of the very highest quality at the lowest cost.

Exhaustive tests on the TIE WEAR MACHINE show the RACOR TIE PAD to be most effective and economical in preventing the mechanical abrasion of railroad ties and bridge timbers. Actual field performances also prove that tie life is definitely prolonged when pads are applied to ties in curves, turnouts and bridges. When used under insulated joints the life of the insulation is extended and joint maintenance is reduced.

The low price of the Racor Tie Pad permits its economical use where all such applications are made.

Contact your nearest RAMAPO representative for further information.

AMERICAN Brake Shoe COMPANY

RAMAPO AJAX DIVISION

109 North Wabash Avenue, Chicago 2, Ill.

America's most complete Line of Track Specialties

RACOR STUDS

AUTOMATIC SWITCH STANDS

VERTICAL SWITCH RODS

SAMSON SWITCH POINTS

SWITCH POINT LOCKS

RAIL LUBRICATORS

ADJUSTABLE RAIL BRACES

DEPTH HARDENED CROSSINGS

REVERSIBLE MANGANESE STEEL CROSSINGS

MANGANESE STEEL GUARD RAILS

MANGANESE STEEL SWITCH POINT GUARD RAILS

Write for descriptive folder.

Sales Offices: New York, N. Y.; Buffalo, N. Y.; Cleveland, Ohio; St. Louis, Mo.; Denver, Colo.; San Francisco, Cal.; Niagara Falls, Ont., Canada.

Plants: Chicago, Ill.; Chicago Heights, Ill.; E. St. Louis, Ill.; Buffalo, N. Y.; Superior, Wis.; Pueblo, Colo.; Los Angeles, Cal.

RAILWAY TRACK and STRUCTURES

TRADEMARK

VOL. 50, NO. 2 FEBRUARY, 1954

Published on the first day of each month by the

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 West Monroe St., Chicago 3

•

New York 7,
30 Church Street

Washington, D. C., 4
1081 National Press Bldg.

Cleveland 13,
Terminal Tower

Portland 5,
514 Terminal Sales Bldg.

San Francisco 11,
244 California Street

Los Angeles 17,
1127 Wilshire Blvd.

Dallas 4,
2909 Maple Ave.

•

James G. Lyne, *President*, Samuel O. Dunn, *Chairman Emeritus*, J. S. Crane, *Vice-President and Secretary*. C. Miles Burpee, Harry H. Melville, C. W. Merriken, John R. Thompson, William H. Schmidt, Jr., Fred W. Smith, John S. Vreeland, *Vice Presidents*. Robert G. Lewis, *Assistant to President*. Arthur J. McGinnis, *Executive Vice-President and Treasurer*. Ralph E. Westerman, *Assistant Treasurer*.

•

Subscription price to railroad employees only in the U.S., U.S. possessions and Canada, $1.50 one year, $2 two years, payable in advance and postage free. Subscription price to railroad employees elsewhere in the Western Hemisphere, $5 one year, $10 two years. All other countries, $7 one year, $14 two years. Single copies 50¢. Address correspondence concerning subscriptions to Robert G. Lewis, Assistant to President, 30 Church Street, New York 7.

Member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.), and is indexed by Engineering Index, Inc.

PRINTED IN U.S.A.

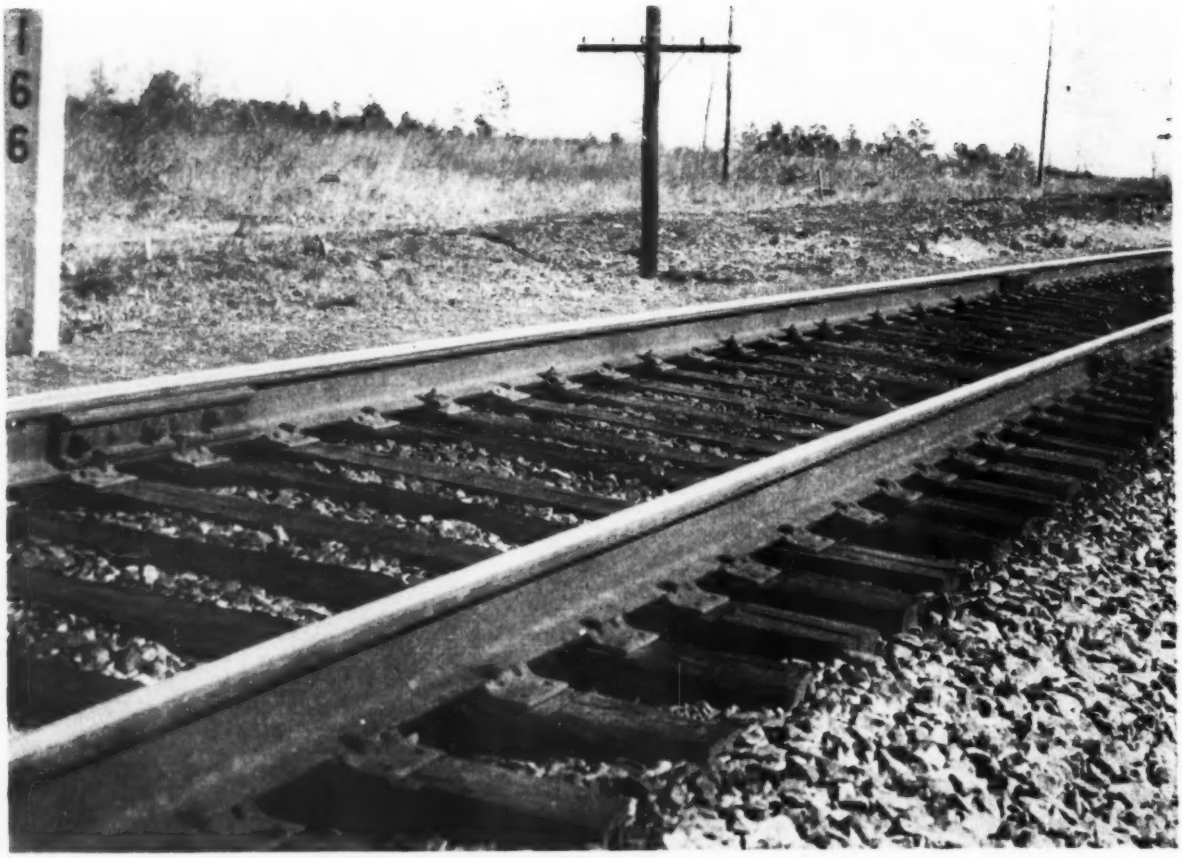
MERWIN H. DICK
Editor

HALBERT H. HALL
Associate Editor

FRED W. SMITH
Business Manager

R. E. DOVE
Associate Editor

ROBERT F. LINDSAY
Associate Editor



With COMPRESSION ANCHORS . . .

Expansion Gaps Are Accurately Maintained

Let's Get Down to "Brass Tacks"

This is another in a series of factual, down-to-earth advertisements on rail anchors. Some of these are little known facts; others will bear repeating. They all add up to this; that year in and year out—COMPRESSION ANCHORS are a *better* buy!

Uniform expansion is another reason why Compression Rail Anchors are preferred by a host of roads.

Uniform holding against traffic in both directions saves tie wear. Tie spacing is held providing protection against slewed ties and permitting the smooth operation of mechanical tampers.

Compression Anchors are also being successfully used for "tight rail" where rail ends are laid flush.

THE RAILS COMPANY

General Office

178 GOFFE STREET, NEW HAVEN 11, CONN.

ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.

Solving the Foreman Problem

A favorite topic of conversation among maintenance-of-way officers is the difficulties they are encountering in finding sufficient interested and qualified men for promotion to the position of track foreman, especially in the vicinity of metropolitan areas. Complaints heard from numerous supervisory officers indicate this is a very common problem. It is produced by a combination of circumstances, but whatever the other conditions may be those who have it nearly always bring out the fact that the narrowing margin, percentagewise, between the wages of laborers and foremen is a factor in discouraging qualified men from assuming the heavier responsibilities that go with the position of foreman.

When we imply there has been a great deal of conversation about this problem we mean this literally as well as in the sense that there seems to have been more talk than action. In addition to the numerous private conversations that have taken place regarding it, the problem has been the subject of discussions before various groups of maintenance-of-way officers. These discussions have been interesting and enlightening, and some worth-while suggestions have come out of them, but it is questionable whether they have been put into practice to any extent. Anyway, the problem still exists on many roads.

This track foreman problem is unquestionably a difficult nut to crack. Furthermore, its solution may conceivably require the making of decisions that may come pretty hard. For these reasons there may be a tendency to ignore it in the hope that it may miraculously disappear or that events may somehow take care of the conditions causing it. Obviously, such an approach is not a satisfactory way to deal with any problem.

Sooner or later maintenance officers are going to find it necessary to look squarely at the track-foreman situation and to make whatever decisions may be necessary to correct it. The sooner this is done the better. In the meantime many railroads are paying for the delay in the form of reduced efficiency and morale.

More Coordination Needed

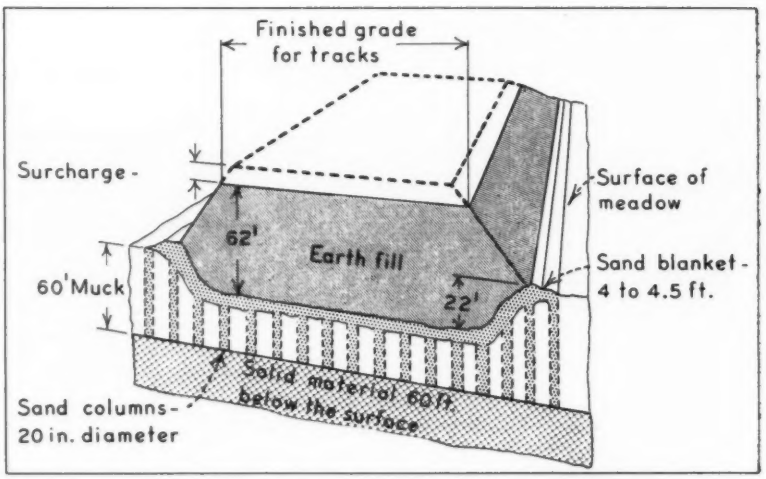
Now that the budgets for 1954 have been approved, the time has arrived when the maintenance department is actively planning its work schedules. This should also be the time to enlist the cooperation of the operating department in developing a schedule which will result in the least interference with the operation of trains consistent with the maximum production of the maintenance forces.

All too often the operating department is not given the plans for maintenance work until immediately before the projects are scheduled to start. This practice can result in poor coordination between train movements and the operations of the maintenance forces, resulting in needless delays and expense. Curses and recriminations then fill the air, with each department berating the other for lack of cooperation. Coordination which progresses down the line from general officers to divisional forces smooths the way for efficient work on both sides and salvages hard cash which otherwise might find its way down the drain.

Even in the field, the roadmaster or the bridge and building supervisor who has some understanding of the train dispatcher's problems—and likewise, the dispatcher or trainmaster who can also appreciate maintenance difficulties—can help to promote real savings by coordination and planning.

There are few practical maintenance men whose experience has not paralleled that of the pile-driver foreman who requested information on approaching trains from a notoriously uncooperative train dispatcher only to be told by the dispatcher that he did not know where his trains were. The angered foreman immediately proceeded to drive a large concrete pile in the center of the track remarking, "I'll find them for him . . . right behind me."

Applying modern principles of soil mechanics, sufficient stabilization of a 60-ft. layer of swampy muck was effected to construct a stable embankment for a two-track main line on the New York & Long Branch over a boggy meadow at Matawan, N. J. The $1-million project included the application of a pervious sand blanket, the driving of sand piles, and the gradual imposition of an embankment and surcharge load to produce a consolidation of the muck.



METHOD OF CONSOLIDATION consisted of constructing a sand blanket and sand columns, then gradually applying the embankment and surcharge loads until the water was squeezed out of the muck, leaving only the solids. A total settlement of as much as 22 ft. was recorded along the middle of the fill.

Construction of Consolidated Fill . . .

THE NEW FILL supports the two main tracks 33 ft. above the swamp surface. The line of well points along the toe of the slope, and another line along the opposite toe, were helpful in equalizing the underground pressures while consolidation was being effected, and also speeded up de-watering. The cinder ballast will have stone ballast applied over it later.

. . . Lifts Slow Order Over Swamp

● The New York & Long Branch, owned and operated by the Central Railroad of New Jersey and by the Pennsylvania, recently marked the completion of a $1-million project at Matawan, N. J., which resulted in the placing of a high earth fill across an unusually mucky meadow where stable foundation material lay 60 ft. below the surface of the natural ground. Although the placing of a fill across a swamp is not at all unusual, the application in this instance of modern principles of soil mechanics to assure an embankment that would require little or no future maintenance is of engineering interest.

The NY&LB was constructed as a single-track line in 1875, the track being carried over the Matawan meadow on a trestle supported on long piles. When the line was double-tracked in 1888, only the

SAND BLANKET of washed coarse sand is applied on stripped surface of swamp.

SETTLEMENT PLATFORMS, with pipe extensions in 1-ft. increments, are placed strategically on sand blanket.

1,000-ft. trestle over Matawan meadow remained as single track. In 1915, the road built a second single-track trestle alongside the first.

Structure Destroyed by Fire

During the small hours of December 6, 1946, both trestles caught fire and were totally destroyed. To permit service to be restored quickly, a new frame-bent trestle was constructed with the bents supported on the cut-off stubs of the old piles. The new trestle was a single-track structure and included a ballasted deck, fire breaks and other devices to assure both safe operation and protection from fire. However, since it was necessary for single-track operation at this point to be conducted under a slow order of 15 mph, the arrangement was not altogether satisfactory and the pressure of public opinion resulted in the consideration of a second track across the meadow.

Another pile trestle would mean frame bents and fire-retardant construction; yet such a structure would still retain the potential hazard of being damaged by fire. On the other hand, a permanent type of structure would mean an expensive substructure to reach stable foundation material. Still another possibility was the construction of an embankment; for many years this alternative had been considered impracticable because of the unstable ground which experience had shown would create unsatisfactory maintenance conditions.

However, because of the great strides which have been made in recent years in the technique of soil mechanics, whereby soils ordi-

TEMPORARY CULVERT for Matawan creek was installed to permit rig for driving sand piles to work in this area.

SAND PILES were driven in four patterns, varying from 6 ft. to 9 ft. centers in both directions. Pile-driving rig and mobile crane with clamshell are at right.

EMBANKMENT was built up at the rate of one foot a week and in 6-in. layers, then compacted by wobble-wheel rollers.

PERMANENT CULVERT for Matawan creek consisted of three lines of 9-ft. concrete pipe supported on timber piling and framing.

narily unsuitable for foundation materials can be stabilized, and also because of the economy resulting from the use of modern earthmoving machines, it was decided to construct an embankment for two tracks across Matawan meadow, thereby avoiding future bridge maintenance and renewals. To avoid interruptions to traffic or the work it was decided to construct the new tracks 127 ft. west of the existing trestle and connect them by means of a 3-deg.–2-deg. reverse curve with the existing tangent tracks lying north of the trestle and by a 2-deg. 45-min. curve with the existing curved tracks lying south of the trestle.

Plan of Procedure

The engineering department of the CRR of NJ, which handled this project, retained the firm of Porter-Urquhart, Associated, Newark, N. J., as engineering consultants and a method of work procedure was projected for the construction of a stable embankment across the swamp. Plans called for the placing of a sand blanket over the area on which the embankment was to be supported; the driving of vertical sand piles in this area; the placing of embankment material and an overload in such a way as to squeeze the water out of the underlying muck into and up the sand piles, and thence through the sand blanket where it could escape by surface drainage; the installation of settlement platforms, control stakes and pore pressure-measuring devices to assure that the placing of the embankment and overload could be properly and safely controlled without undue displacement of the underlying material; and the construction of a temporary and a permament culvert through the new embankment for Matawan creek, so as not to obstruct this waterway.

Construction work was started on July 2, 1951, and continued over a period of more than two years before it was completed on September 10, 1953. The first step consisted of the clearing and grubbing of all trees, stumps, brush, weeds and rubbish from the grading areas, as well as the removal of five buildings. This work was followed by the stripping of the embankment areas as well as cut areas lying north and south of the trestle.

The swamp area which was subjected to the special treatment was about 260 ft. wide and 1000 ft. long. The materials imposed over this area in the construction of the fill included two classes. Class I material, used for the sand blanket and also for the vertical sand piles, was a relatively course washed sand and gravel chosen for its ability to permit the free flow of seepage. The stipulated requirements provided that 100 per cent of the sand and gravel should pass through a 2½-in. screen and that 60 to 100 per cent pass through a ½-in. screen. Of the particles passing through a No. 4 screen, the grading analysis required that 30 to 100 per cent should pass through a No. 8 screen and from 0 to 15 per cent through a No. 80 screen. The amount passing through a No. 200 screen was limited to 0 to 2 per cent.

Class II material, which was used as embankment and surcharge loading material, contained more fines as well as larger aggregates. For this class of material it was required that the particles should be less than 4 in. in the largest dimension and should not contain more than 30 per cent passing a No. 200 sieve, except that, where the material was to be used as overload, the top 2 ft. should contain fines showing 35 per cent or more passing a No. 200 sieve.

Control Devices Used

After the clearing, grubbing and stripping work had been completed, 100 control stakes, 8 ft. long, were set immediately surrounding the area where the sand blanket was to be placed. These stakes were planted to a true plumb and in straight lines so that any deviation caused by lateral movement would be discernible. A sand blanket, from 4 to 4.5 ft. thick, was then formed of Class I material on the south side of Matawan creek. This material was deposited from trucks by end dumping and was spread by crawler bulldozers. Since the Class I material was quite loose and hence unsatisfactory as a working surface for heavy equipment, a working platform of Class II material, 2 ft. thick, was placed over the completed sand blanket. The Class II material was placed in successive layers, 6 in. thick loose measurement, with each layer compacted by a wobble wheel roller to not less than 95 per cent density.

However, prior to the deposition of the Class II material, 60 settlement platforms were placed on the top surface of the Class I material so that total settlement could be

TWO MAIN TRACKS were constructed on the finished subgrade. A Gradall machine also helped in lining track.

determined at any stage of the work. These platforms were simple in construction and each consisted of two transverse layers of 1-in. lumber nailed together to form a platform 4 ft. square, to which a vertical 2½-in. pipe was fastened by means of a screwed flange. The vertical pipes were provided in short increments so that they could be extended upwards through the embankment as the grading work progressed to the top of the overload.

Still another control used with this work consisted of 32 pore pressure-measuring devices. These were installed at strategic locations and at depths of 13 ft., 26 ft., and 37 ft. below the natural ground for checking the consolidation of the muck and to indicate the rise in pressure when additional loads were applied and also the drop in pressure as the water left the muck through the sand drains and blanket. A time record was kept of the pressures so that overloading and possible collapse of the fill could be avoided. These control devices were installed prior to the driving of the sand piles.

Vertical Sand Drains

On the completion of the compacted working platform, the contractor then moved in a heavy crawler-mounted pile-driver having an air-actuated hammer working in long leads, a wheel-mounted mobile crane equipped with a clamshell bucket, and two wheel-mounted air compressors, and commenced the work of sinking the vertical sand drains. These drains or piles were formed by driving a 20-in. mandrel-plugged casing through the muck and into the firm strata below it after which the mandrel was withdrawn. In the meantime sand had been deposited by the clamshell in a skip attached to the pile driver. This was then deposited in the casing by raising the skip. A gate at the top of the casing was then closed and compressed air introduced into the casing to compact the sand and to hold it in column form while the casing was withdrawn. The bottom of the casing was equipped with a flap gate which was in the closed position while being driven and in the opened position while the casing was raised.

The sand piles, 2,200 in number, were driven in four regular patterns. One pattern covered a strip 130 ft. wide along the center line of Matawan creek where the piles were driven at 6-ft. centers in each direction. The second pattern covered a strip 91 ft. wide along the proposed center lines of the tracks where the piles were driven at 7-ft. centers in each direction. In the third pattern which covered a strip about 32 ft. wide along the east side of the track strip, the piles were driven at 8-ft. centers, while in the fourth pattern, covering a strip 36 ft. wide along the west side of the track strip, the piles were driven at 9-ft. centers. The second, third and fourth driving patterns did not prevail where the first strip crossed them.

Culvert Is a Special Problem

While the contractor was driving the sand piles in the area in the south side of Matawan creek, the sand blanket was being constructed in the area north of the creek. When this had been completed, two temporary lines of 48-in. culvert pipe were installed along the line of Matawan creek, the two lines being spaced a sufficient diistance apart to permit the driving of the sand piles according to the first driving pattern. When the temporary culverts had been installed, the sand blanket was placed over the creek area to permit the driving rig to work there.

Actually, the drainage area called for a much larger opening under this embankment than the two temporary culverts provided. It was determined that three lines of 9-ft. flat-base culvert pipe would be adequate for the permanent opening and that these culverts should be supported on timber piling and a timber frame to prevent settlement.

After the sand piles had been driven in the area of the creek bed, the contractor drove untreated wood sheet piling through the sand blanket in two lines, 70 ft. apart, parallel with Matawan creek. The sheet piling consisted of tongue-and-groove timbers held in line by waling timbers that were tied back by steel rods to anchor piles driven at 4-ft. centers. The area between the two lines of sheet piling was then excavated down to the original ground surface, and 630 timber piles about 65 ft. long were driven and a timber frame constructed to support the three lines of Massey 9-ft. precast concrete flat-base culvert pipe. Concrete headwalls at each end completed the culvert installation.

Application of Load

By May 10, 1952, and prior to the driving of the timber piles for the permanent culvert, about 8 ft. of of Class II material had been deposited over the sand blanket. This material had been applied at the rate of 1 ft. a week and in 6-in. compacted layers. Weather conditions during the latter part of May and in June 1952, hampered the work and it was found that the pressures were not building up equally in a few spots. Normal progress of the work was slowed down until the pressures were equalized, and during the slow-down the permanent culvert was constructed.

To prevent the weight of the new fill from crowding the existing trestle out of line, a counterweight fill was placed on the east side of the trestle. This counterweight was

about 6 ft. high and 20 ft. across the top, and was composed of material excavated from the areas beyond the swamp where connections to the existing tracks were being constructed.

It was originally believed that the main embankment could be constructed solely with the use of sand piles. But as the embankment increased in height it became apparent that something more was needed to provide full stability of the side slopes and an adequate factor of safety, and it was decided to construct berms on each side of the main embankment. These berms were constructed as the embankment work progressed and were made approximately 65 ft. wide and 5 ft. high.

By October 6, 1952, Class II material had been applied to a depth of 21 ft., and the control devices showed that the sand blanket had settled about seven feet. Not being satisfied with the rate at which the water was leaving the underlying muck, and also to help equalize the underground pressures, the railroad had a well-point dewatering system installed. This consisted of a line of well points driven about 12 ft. apart along the toe of each side of the new embankment. The points were driven to a depth of 50 ft. At first, the dewatering pumps were operated continuously. Later they were pumping for two tricks only, and finally for one trick. It is believed by the railroad that this work marks the first time that a well-point system has been used in connection with sand drains in a project of this magnitude.

Meanwhile, the loading continued until a surcharge load, about 5 ft. deep above the subgrade, had been applied. After a period of about 30 days the pore pressure-measuring devices and the settlement platforms indicated that total subsidence had been effected, and the surcharge load was removed to provide a finished subgrade 35 ft. wide. It was determined that the natural ground under the middle of the fill had settled as much as 22 ft.

Two main tracks were then constructed over the new embankment and were connected to the existing tracks north and south of the old trestle. Cinder ballast was used on the initial track raise, then stone ballast was applied to bring the top of rail 28 in. above subgrade level. The first train passed over the new tracks on June 9, 1953, but the final surfacing to permanent grade was not completed until September 10. Since that time there has been practically no settlement of the fill.

The completion of this work has given the railroad a solid fill across the swamp. In contrast with the 15-mph limit placed on the single-track trestle train speeds up to 45 mph are new permissible. The work was done under contract, except for the track construction, and was handled by J. Rich Steers, general contractors, New York. The track work was done by railroad forces. The project was carried out under the general direction of S. L. Mapes, chief engineer, New York & Long Branch, in collaboration with the engineering consultants. B. J. Minetti, engineer structures of the road, was in direct charge of the work, and C. H. Vogt, engineer maintenance of way, supervised the track work.

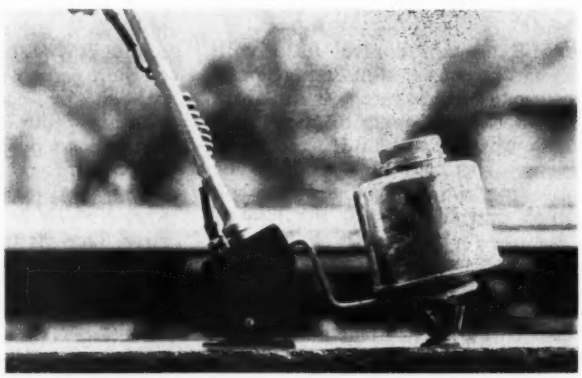
Oiling Attachment Improves Audigage Operation

In the ultrasonic testing of rail, turnout parts, and incidentally many other metallic objects, that part of the searching unit which contacts the surface of the materials under test is an accurately ground quartz crystal. For the successful use of this method it is essential that no air gaps exist between the surface of the crystal and the surface of the articles to be tested, in order that the sound waves may have a continuous path over which to travel.

Since most tested objects are neither perfectly flat, smooth, or clean, a fluid couplant is used to provide a perfect contact. Water may, and has been used, for this purpose. However, oils usually make the best couplants because their lubricating qualities protect the crystal from wear.

When Audigages were first used on the Santa Fe for the large-scale testing of rails in the joint areas and turnout parts, one man with a long-spout oil can was assigned to spread oil on the rails ahead of the man doing the testing. This method proved unsatisfactory because of the labor cost. It was difficult, moreover, to avoid applying more oil than was required. Excessive oil also caused wheel slippage of equipment using the trackage.

To overcome these difficulties, E. W. Scott, a transitman at Marceline, Mo., developed an oiling device for attachment to the long-handled searching unit, which was designed to wipe a sufficient amount of oil on the rail or turnout parts to satisfy the minimum requirement of the testing device. After further improvement by J. R. Rushmer, roadway engineer, this device was furnished for use on all the Santa Fe's Audigages.



SWITCH LAMP FOUNT, mounted on Audigage testing device, saves oil and labor in rail testing.

The device, as illustrated, consists of an inverted fount from a switch lamp, with the wick dragging on the rail. An opening, provided with a screw cap, was cut in the bottom (now the top) of the fount to permit ease of filling. The oiling device is attached to the searching unit by means of a rod which is looped around and brazed to the neck of the fount. This rod is further bent in a "Z" shape for attachment to the head of the searching unit. The wick projects a sufficient distance below the wick guide to prevent electrical shorts between the metal of the device and the rail or other objects.

Says The Author:

A very competent maintenance man once told me that the maintenance-of-way department always had to live by its wits. I subscribe to this statement only in part, as I have found after 37 years of service, part of which was spent as an operating superintendent, that it takes more than wits; it takes all of the combined brains of all departments, it takes very careful planning in the programming of work and it takes the utmost tact and skill to work with and secure the wholehearted cooperation of the other departments. We must enlist their aid in order that we can make our own dollar go the limit, avoiding much unproductive time, or time paid for and not worked, which, in some instances on busy operating divisions, is a very large item. To get this aid from the transportation department on a busy railroad is not easy, but it is still our responsibility to do so by proving to them that the dollars available, whether for new work or maintenance, all come out of the same pocket. Our stockholders, directors, and top management are not much concerned with individual departments; they are more concerned with the entire team and the final or net result as to what we get for the dollars expended.

Every maintenance officer, however low or high his position may be, upon acceptance of the position, and his continuance in that position, has a deep obligation to the engineering profession and the maintenance department. His first trust is to the company, the stockholders, the directors and the officers above him, as well as below him in his own department as well as other departments. Last, but by no means least, is the obligation he has to his superior who, in most instances, is the operating vice-president and who, on most railroads, is carrying the ball for all of us whether the performance is good or bad.

Mr. Hursh

Greater M/W Efficiency . . .

How It Has Been Accomplished

By S. R. Hursh
Chief Engineer, Pennsylvania
Philadelphia, Pa.

Advent of the 5-day week and other developments have forced maintenance-of-way departments to devise and put into effect many measures for increasing the productivity of their forces. In this article, which is based on an address presented before a recent meeting of the New England Railroad Club, Mr. Hursh tells of the progress made and how it has been achieved.

● In recent years, aside from the great increase in the cost of materials and labor, one of the hardest jobs confronting the maintenance departments of all railroads was the advent of the five-day week, which went into effect on September 1, 1949, at a time when it did not hurt any of us too much, as it was near the end of the heavy work program. At that time many maintenance men had the view that it would be physically impossible to maintain, on a 5-day week basis, a railroad that operated as many trains on Saturday and Sunday as on weekdays.

The question now is this: What has been the result? This can best be shown by using figures from my own railroad. It does not mean, however, that other railroads have not done an outstanding job. To illustrate this point figures will also be given for the New York, New Haven & Hartford, the New York Central, and the Boston & Maine.

The table (next page) gives, for PRR, the man-hours of labor in the various categories of Group 3 in the maintenance-of-way department for the years 1948, 1951 and 1952 and makes comparison between 1948 and the subsequent years, and between 1951 and 1952. It will be noted that the total track force showed a 20.3 per cent reduction in man-hours, between 1948 and 1951, and an additional 11.6-per cent reduction between 1951 and 1952. The reduction in the bridge and building force was almost as impressive.

Affect of Machinery

On the other hand the reduction in the "other force" category was not so impressive. In fact there was an increase of 0.76 per cent in the man-hours in this group in 1952 compared with 1951. This situation is explained by the increased use of machinery, as it is the "other force" group that contains most if not all of our work equipment engineers and machine operators. The savings made by the use of more machinery greatly offset the slight increase in man-hours in this group, for it was only because of the more extended use of machinery that we were able to make the savings secured in the track and bridge and building force.

The picture showing the economies effected or efficiency obtained is even more striking when we compare the gross ton-miles hauled in 1929 with 1952 and the man-hours consumed in maintaining the railroad during the same periods. These figures for the Pennsylvania are as follows:

Gross Ton-Miles in 1929	174,429,518	(000)
Gross Ton-Miles in 1952	160,085,643	(000)
Reduction from 1929 to 1952	14,343,875	(000)– 8.22%

CLEAN STONE BALLAST, good treated ties, large tie plates and heavy rail get major credit for M/W economies.

Total M.W.&S. Man-Hours —1929	84,317,914	
Total M.W.&S. Man-Hours —1952	36,916,291	
Reduction from 1929 to 1952	47,401,623	—56.22%

The picture for the year 1953 will show up equally as well as further strides have been made toward increasing our efficiency by getting more productive man-hours. This has been accomplished by reducing the ratio of supervision to labor and by the use of more machinery, giving us better work than can be obtained by hand labor.

In citing these figures showing the increased efficiency of the M/W forces I have used the PRR as an example only because the necessary data are more accessible to me than are that of other roads. However, on the basis of an assumption, it is a simple matter to compute the M/W man-hours of other railroads for various years. The assumption is that other railroads spend the same percentage of their total M/W budget for labor as does the PRR. We can then take the total M/W expenditures (as published in reports of the Interstate Commerce Commission), multiply by the PRR labor ratio, to get the expenditure for labor, and then divide by the hourly pay rate to get the man-hours. When we do this for 1948 and 1950 for the major roads serving New England, using the average hourly rate for the Eastern district, we get the following man-hours:

		PRR	NYC	NYNH&H	B&M
1948		57,331,356	55,384,978	11,605,182	7,610,411
1950		44,866,681	36,552,717	7,554,118	5,348,648
	D.	12,464,675	18,832,261	4,051,064	2,261,763
	D.	21.74%	34.0%	34.91%	29.72%

These figures show very clearly that on all these roads there was a very marked reduction in the actual man-hours worked between the last full year of the 6-day week and the first full year of the 5-day week.

Greater Efficiency Explained

How have these reductions in man-hours been accomplished? The answer lies in all the measures that railway managements have taken to reduce the amount of maintenance work required and to get the maximum productive return from each dollar expended for maintenance work. Practically all of these measures have entailed capital investments of one kind or another. Some of the more important are described below.

In the past 12 to 15 years great emphasis has been placed on drainage, not only in the form of adequate underground drains where none had been provided when the railroad was originally built, but also by widening the ditches in cuts and providing suitable berm ditches; in some instances, going almost to the extent of making fills out of inadequate cuts. In many cases on some raliroads the cut or fill was originally constructed to support a one-track railroad. Later on it was necessary to have two or more tracks and the additional track was laid along the existing track without suitable or proper ditches in the cuts or shoulders on the fills. In view of our present-day wheel loads and speeds there is a tremendous amount of work yet to be done on many roads in the nature of stabilization if we are going to save our maintenance dollar. Using present-day, modern and efficient earth-moving machinery, one or two men, with the job properly programmed, can do wonders and move earth from cuts to fills at a very low cost. This type of work is constantly being done on most railroads today.

But it is a waste of time and effort to talk drainage

Pennsylvania Railroad—Total Man-Hours—M. W. & S. Force—Group 3

	Extra Gang Foremn	Extra Gang Men	Section Foremen	Section Men	Total Track Force	Bridge & Building Force	Telegraph & Signal Force	Other F Force	Total Group 3 Ad-68
1948 (6 days)	1,034,126	9,321,556	4,145,168	22,056,274	36,557,124	5,451,992	5,182,767	2,811,269	50,003,152
1951 (5 days)	788,099	6,718,989	3,423,364	18,207,506	29,137,958	4,512,840	5,126,374	2,559,719	41,336,891
1952 (5 days)	754,030	6,140,673	3,297,291	15,575,152	25,767,146	4,116,275	4,453,482	2,579,388	36,916,291
Per Cent Difference									
1951 Vs. 1948	—23.8	—27.2	—17.4	—17.5	—20.3	—17.2	— 1.1	—9.9	—17.3
1952 Vs. 1948	—27.0	—34.2	—20.5	—29.4	—29.5	—24.5	—14.07	—8.24	—26.2
1952 Vs. 1951	— 4.32	— 8.61	— 3.69	—14.46	—11.6	— 8.8	—13.1	—0.76	—10.7

and provide drainage if your maintenance program does not provide for the necessary cleaning of stone ballast in the "six-foot" and the shoulders. I know of no easier way to throw away good maintenance dollars than to try to maintain track on mud. The track-laying and surfacing money now spent by our Class I railroads is much too high, and one of the main reasons is that there is not enough ballast cleaned each year to keep the track well drained. Every maintenance man knows you can not have tight track with mud pumping in the joint and quarter ties.

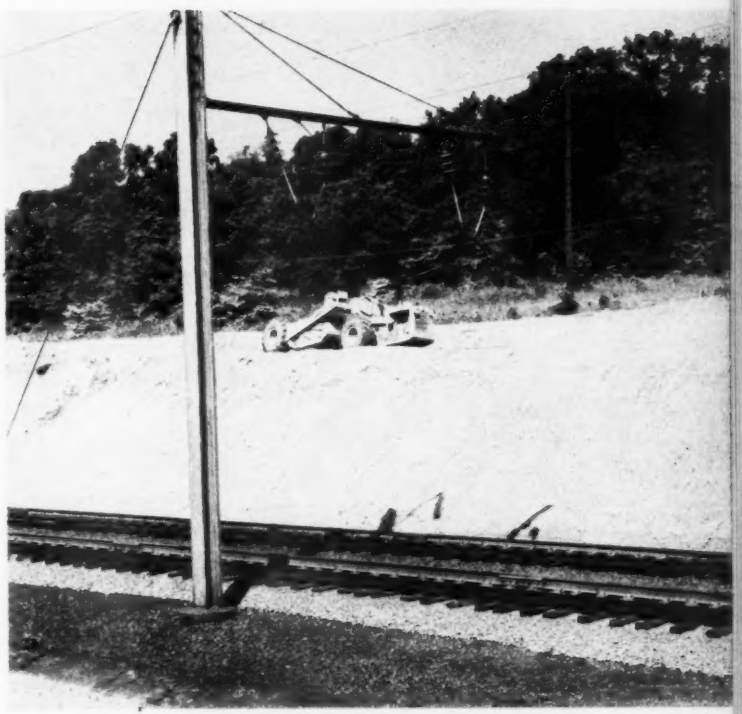
We all know of the wonderful improvement made in the track structure by the use of treated ties. We were all doing a wonderful job in this respect up to and partly through the last world war until good grades of hardwood ties became scarce and expensive. In order to get ties, some railroads cut down on their specifications and, in addition, accepted ties made of inferior woods, considering their traffic. This to my mind was a very foolish and expensive move which they will be paying for in years to come.

The action of the New York Central years ago in going to 24 ties to the 39-ft. rail was a major forward step and one that will pay good maintenance dollars in return. When it is considered that 57 per cent of our maintenance dollar goes for labor and that labor will be the last commodity to go down in price, it is economy to buy the very best of materials and then take care of those materials through good maintenance.

Are you using the proper weight of rail on your railroad, giving due consideration to the traffic and speeds you are imposing upon the track structure? Every maintenance man knows that it costs no more of the maintenance dollar to lay a mile of so-called heavy rail than it does light rail. As a matter of fact, by following through under proper I.C.C. accounting it costs you less because the heavier the rail you start with the more rail you have to turn over under a betterment program. We likewise know that it costs no more in labor to raise, tie, and tamp a mile of so-called heavy rail than it does to raise, tie, and tamp light rail. I am sure we all agree that studies made to date, coupled with the experience of those roads using heavy rail, prove conclusively that once the rail is properly raised, tied, and tamped, it will last two to four years more before it must be reworked. Even so, the question may still be asked: What is the proper size rail for a given railroad? My answer is: The heaviest rail you can economically justify for the traffic to be carried is the proper size and will prove to be the cheapest over the years.

In view of the high cost of white oak bridge ties and the cost of installation and maintenance of open-floor bridges, we went to the policy 8 to 10 years ago of not renewing in kind the superstructure of any open-floor bridge where the expected additional life span of such structure would be 50 to 60 years. Where the superstructure of such bridges has to be renewed because of needed repairs or obsolescence due to larger power we consider it more economical to replace the superstructure with a solid floor, using regular stone ballast and track ties for the track structure. We have then eliminated the cost of expensive bridge ties and the painting of steel, and a track gang can maintain the track without having the help of high price carpenters. Another advantage is elimination of the fire hazard.

Just as great potential savings can be made in bridge renewals, so should careful study be given proposals for constructing new interlocking towers, stations, and shops and enginehouses. It may cost you $75,000 to $100,000 more in first installation to obtain a building constructed of materials that require a minimum of maintenance and cleaning, but over the years you will find it is money well spent.



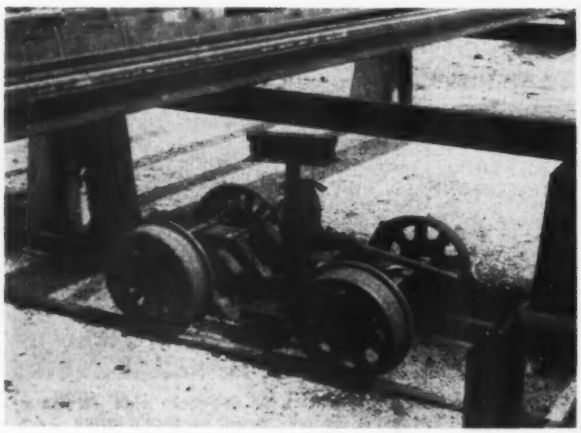
GOOD DRAINAGE, as provided by adequate side ditches and suitable berm ditches, is receiving great emphasis today.

Let me emphasize that labor in whatever category will never go backward—it must always go forward, and we must forever build to require a minimum of maintenance. Aside from the principal items mentioned, I think the greatest strides made by all railroads in the past 10 years have been in the matter of mechanization to perform not only track work, where the greatest progress has been made, but also in bridge and building work. Some roads have of course made greater progress than others, but even those who have made the greatest progress have still a great field and many problems to conquer.

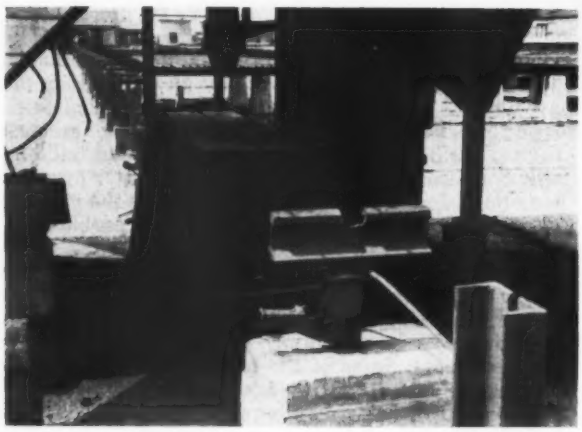
Our road, by virtue of its size, has in all probability more money invested in labor-saving machinery than some of the others but, here again, the field or problem is relative. We have roughly $28,000,000 invested in such equipment. Some of the machines, of course, are quite expensive, but when it is considered that some of them will do in 3 hr. working time the equivalent of 1,112 men working 8 hr. per day, one can readily see the saving in dollars. We have numerous other machines that do not cost many dollars but which in a day's time save us 30 to 40 full-time workers. It is not by buying machines we lay men off—it gives us men to do other needed work which, without machines, would not be done. It is the properly designed machine which is easy to keep in repair that gives us more production with fewer men in the gang.

In summation, I would say the greatest contribution towards lowering the man-hours consumed in the maintenance of our railroads has been the cleaning of stone ballast, the one hundred per cent use of good treated hardwood ties, the large tie ,plate, the use of heavy rail, and the great strides in mechanization we are now profiting and will continue to profit from what has been done in the past ten to fifteen years.

RAIL-CROPPING PLANT of the Atlantic Coast Line is located at Rocky Mount, N. C. Approximately 12,000 gross tons of rail are processed here each year.



SPECIAL RAIL CARRIER is a homemade contrivance for moving rails on skids to "production-line" rollers. Its jack lifts the rail at the center, then it carries the rail to rollers.



BENT RAILS are straightened by this 150-ton hydraulic press. Note jack embedded in pedestal support for producing proper bending correction.

Special Devices Help

Reduce Rail—

ACL increases efficiency of rail-cropping plant by incorporating special rail carriers for moving rails to and from skids, a chain elevator for carrying away cropped ends and piling them outdoors, and by-pass skids for temporary storage of rails to permit sawing to continue without waiting for the slower drilling operaion. Also, the value of scrap rails is increased by using idle sawing time.

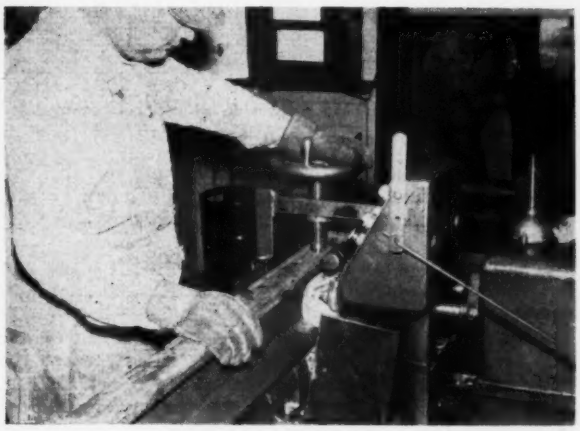
● When the Atlantic Coast Line ships rail released from relays to its rail-cropping plant at Rocky Mount, N. C., it is certain of getting back from 200 to 260 cropped rails (about 7200 lin. ft.) each full day of sawing and they will be in good condition for relaying. This number of cropped rails is produced at the rate of about 20 rails per man-day, a rate made possible by the plant layout, the work equipment and the locally devised machines used there. Rails with minor wheel burns are cropped and used in side tracks.

The plant is served by a track from which a 25-ton American locomotive crane, equipped with a 54-in. magnet, unloads the rails (five at one time) onto one of four sets of rail skids located at the north end of the plant. Each set of rail skids consists of three long rails about 60 feet long which are supported by concrete pedestals. These skid rails are at a level slightly above car-floor height, thus eliminating high lifts that might otherwise be necessary by the crane.

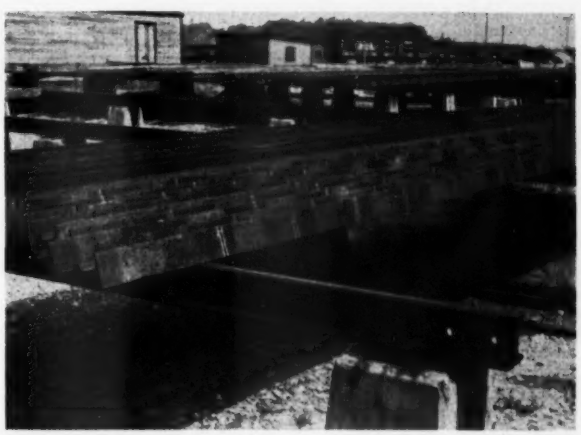
About three per cent of the rails received at Rocky Mount for cropping require straightening. The bends

SHOWER OF SPARKS marks trails of the hot steel particles as thrown out by the friction rail saw.

ANOTHER INNOVATION is a homemade chain conveyor for taking the cropped ends from the saw and piling them outdoors. This device saved the services of one man.



BOLT HOLES are drilled two at one time to accurate spacing. Drilling requires about 30 seconds for each rail end—the slowest operation in the plant.



SCRAP RAILS are scored through bases by saw. They are then lifted by crane magnet and dropped, causing rails to break into small sections. This enhances the scrap value.

Cropping Costs

are removed by means of a Hammifin 150-ton hydraulic press which is housed in a small shelter north of the rail skids. This hydraulic press is also used to punch rail-spike holes in the secondhand tie plates recovered from 100-lb. rail relays. These plates are processed through this plant for application under 85-lb. or 70-lb. rails used for branch-line and side-track relays.

On the off-track end of the rail skids, a row of concrete pedestals, on which rollers are mounted, extends for the entire length of the cropping plant. These serve as the "production line" along which the rails are pushed by hand for processing through the plant.

Small Rail Carriers Used

The moving of the incoming rails from the track end of the skids to the working end formerly required the services of four men as well as liberal quantities of diesel flushing oil which was used for greasing the tops of the skid rails. To reduce the cost for doing this work, J. J. DuFour, superintendent of the rail-cropping plant, devised special rail carriers which are propelled by one man. Each carrier consists of a metal frame, mounted on four light motor-car wheels having ball bearings and an ordinary track jack. The carriers travel parallel with the skid rails on small rails of narrow-gage tracks.

Through the use of these rail carriers, rails are now moved from one end of the skids to the other by two men. Rails on the skids are turned upright by a man with a rail fork, the carrier is rolled under it and the rail is jacked up to raise it slightly above the skid rails. The rail, with only one end sliding along a skid rail, is then moved by means of the carrier to the production

RAILS ARE TURNED keeping gage side of rails on same side.

line rollers. In addition to reducing the number of men for this operation, the carriers have effected a saving of about 20 bbl. of oil a month for greasing the skid rails.

If the rail does not require straightening, it is pushed by two men along the rollers toward the 48-in. high-speed friction rail saw, made by Kling Brothers Engineering Works, Chicago. The men turn the rail on its side and feed it to the saw, pushing it forward so its end is against a hinged stop which is pre-set for the length of rails being cut. Generally the saw mechanic then crops 18 in. from the end of the rail, drops the stop, and the men feeding the saw push the rail past the blade where another man takes it on that side and pushes it against another pre-set stop. The saw mechanic then crops the other end of the rail.

Conveyor Moves Cropped Ends

It is at this point that another innovation was incorporated. Formerly, one man was needed for picking up the cropped ends and piling them outside of the building. Mr. DuFour fixed a metal apron under the saw blade so the cropped ends fall into it and slide down to a chain conveyor which elevates the pieces, carrying them through a window of the building, and dropping them outside. The chain conveyor is powered by an old motor that was recovered from the propelling mechanism of a scrapped portable compressor. The conveyor thus not only eliminates the services of one man but also removes him from a hazardous work location.

After cropping, the rail is ready for drilling. But the drilling operation takes a somewhat longer time than the sawing operation, being about 30 sec. for drilling one end as compared with about 17 sec. for sawing one end. Hence, unless some provision was made to take this into consideration, the sawing time would be reduced to the drilling speed. This was solved by installing two sets of by-pass rail skids between the saw and the drill. Therefore, when sawing is suspended during the day for necessary inspection of machinery, adjustments, time lost in handling rail on skids, etc., the drilling continues so that by the end of the day there are few, if any, rails on the by-pass skids for drilling.

Approximately every third rail sawed goes on one of the by-pass skids. When the sawing of one batch of rail has been completed, the drilling continues until all of the rails of the batch have been processed, and the men normally employed for sawing and the operations ahead of the sawing are used on some other work in the plant, such as punching tie plates, or are employed in the concrete products yard that the railroad operates at this location.

One man is employed on the by-pass skids. One of his jobs is to turn the rail upright again. Another man feeds the cropped rails to the drill and hammers down the saw burrs at the ends of the rail. The drill is a Moline Tool Company machine, type MR 127, which drills two bolt holes simultaneously. Each time the man feeding the drill pushes a rail to the machine, he puts a distinctive chalk mark on the base of the rail and keeps tally on a blackboard of the number of rails passed.

After drilling, the rail ends are ground and chamfered to the desired finish by a man equipped with an I-R Multivane hand-held electric grinder. Another man then pushes the rail along on the rollers and finally, again with the assistance of a rail carrier, places it on one of four sets of skid rails used for outbound storage. The rails are loaded from these skids into low-side gondola cars by the same crane and magnet used for the unloading.

Different Route for 131-lb.

Rails of 131-lb. section are handled somewhat differently than those of other weights. The heavier rails are brought to Rocky Mount at the present time because of rail-end batter, so it is only necessary to cut off about 6½ in. from the ends and drill a single bolt hole at each end. After sawing, the 131-lb. rails are pulled back on the rollers and placed on the skid rails located immediately adjacent to the saw building. They are moved back on these skids and put through a window of another small building which houses a Niles-Bement-Pond vertical drill. After a bolt hole has been drilled at each end, the rail is moved out onto another line of rollers, where it is ground at the ends and placed on outgoing storage skids.

Costs Are Kept Low

At the present time, the ACL is cropping principally 100-lb. rails released from main tracks. Of the rails released from relays, about 60 per cent is sent to the cropping plant. About 12,000 gross tons of rail are processed through this cropping plant in a year. Since it is necessary to keep costs to a minimum, Mr. DuFour is constantly considering ideas for bettering the performance. In this connection, he has found that having a concrete products yard nearby is a help because the same men working in the rail-cropping plant also can be employed usefully in the concrete yard, thus eliminating lost time when rail-cropping operations are not at full time.

Another way of offsetting the cost of operating this plant is by raising the value of the scrap rail by selling shorter pieces to the scrap market. So at times when the saw is not cropping rail, scrap rails are brought to the saw where they are cut partially through their bases at about 18-in. intervals. Later, these rails are lifted by the crane magnet and dropped, which causes them to break into 17 to 20 pieces each.

By incorporating home-made machines to save time and men, by having plant flexibility for utilizing men and materials to the best advantage, and by increasing the value of scrap rails, the ACL has a rail-cropping plant that just about pays its own way. The plant is operated under the general direction of R. L. Groover, chief engineer, while Mr. DuFour has direct charge of plant operations.

OLD-FASHIONED settees and out-moded appointments have been replaced by . . .

Giving Old Station

. . . **UP-TO-DATE** furniture, including upholstered settees, in modern atmosphere.

That MODERN Look

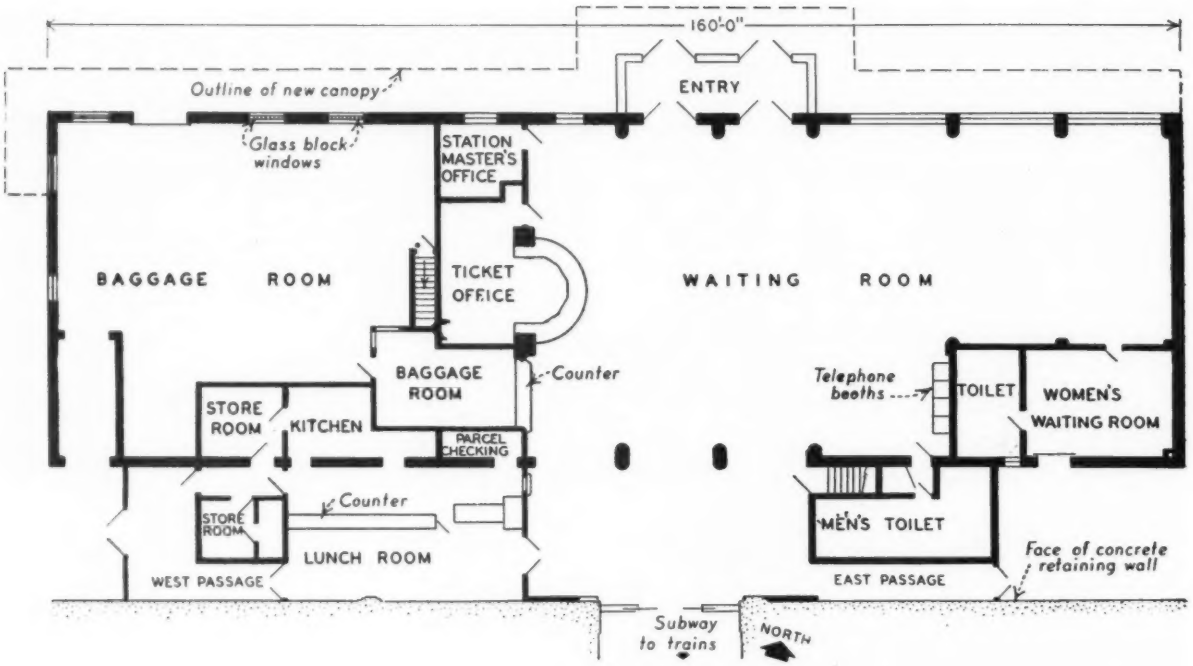
Two-story brick structure on the Northern Pacific at Spokane, Wash., built in 1890, is rearranged and modernized on the interior and also "dressed up" on the outside. The changes included enlargement of the waiting room to meet a special situation arising from schedules.

● In modernizing and remodeling its passenger station at Spokane, Wash., the Northern Pacific departed from current practice in at least one important respect. When passenger stations are remodeled these days the tendency, more frequently than otherwise, is to contract the waiting room into a smaller space on the premises that waiting rooms are not used to the same extent as formerly. However, the Northern Pacific, in remodeling its Spokane station, reversed this trend by enlarging the waiting room. This departure from general practice was not, of course, adopted without good cause.

The situation confronting the NP at Spokane was this: In November 1952 the road put its premier transcontinental streamliners, the North Coast Limited (Nos. 25 and 26) on a new fast schedule between Chicago, the Twin Cities and the North Pacific Coast. The result is that the Westbound North Coast Limited departs from Spokane at 10:53 p.m., while its Eastbound counterpart leaves that point at 10:30 p.m. Slightly earlier in the evening—at 9:10 p.m. to be exact—the westbound Mainstreeter, another transcontinental train, departs from Spokane. In addition, between 8:10 and 10:45 p.m. there are six train arrivals at this point. Of these three departures and six arrivals during evening hours, six of the trains are transcontinental movements which carry the bulk of the traffic in and out of Spokane. During the remainder of the 24-hr. period there are five other train departures from Spokane—all except one of which are local trains—and two arrivals. It was the concentration of activity during the evening hours, aggravated by the new schedule of the North Coast Limiteds, that motivated the railroad to enlarge the waiting room in connection with the modernization project.

Old Station of 1890 Vintage

Built in 1890 the NP's Spokane station is a two-story brick structure with a masonry base course and



WAITING ROOM was enlarged substantially by moving the lunch room to a new location as indicated on this floor plan.

trim on the exterior. Facilities on the first floor of the station included a baggage room at the west end and a general waiting room, a separate waiting room for women, toilet facilities, a lunch room, the ticket office and a baggage checking room. Offices of the division superintendent and other local supervisory officers are located on the second floor.

Antique Interior

The appointments and facilities on the interior were typical of those of an earlier day. These included back-to-back wood settees in the waiting room, an enclosed ticket office with a small window for serving patrons, and incandescent lighting. A large fireplace dominated one end of the general waiting room and there was also a fireplace in the women's waiting room. The second floor was reached by an interior stairway off the waiting room. The floor area in the latter room was obstructed by numerous cast iron pipe columns. Another old-fashioned feature of this room was a wood wainscotting. The floors were of wood as were some of the walls and ceilings, although in the waiting room they were plastered above the wainscotting.

The NP's tracks at Spokane are elevated between retaining walls, with a pedestrian subway extending underneath the tracks to serve stairways leading up to the passenger platforms. The station is at ground level and the track (south) side is separated from the near retaining wall by a passageway 19 ft. wide. Some years ago a roof was constructed over this passageway.

The station improvement work at Spokane was actually started in 1949 when the original covered timber walls and trestle were replaced with gravity-type concrete walls and the pedestrian tunnel and stairways were replaced with concrete construction. The total cost of the project, including the work which has recently been completed, was $475,000.

Extensive Interior Changes

In carrying out the recent improvement work the first-floor interior was extensively rearranged and modernized. With the objective of creating more space for the waiting room the lunchroom was relocated to a position in the passageway between the station and the track retaining wall, although the kitchen and the storeroom for the lunchroom were placed inside the station at a location where they occupy part of the baggage-room area. The men's toilet room was also relocated to a position in the passageway where it is adjacent to a new enclosed stairway leading to the second floor. The space formerly occupied by the men's toilet has now become the station master's office. Another major change was the relocation of the ticket office from its position along the track side of the station to a location at one end of the waiting room formerly occupied by one of the fireplaces. The other fireplace has also been eliminated. While the separate waiting room for women has been retained it was considerably reduced in size.

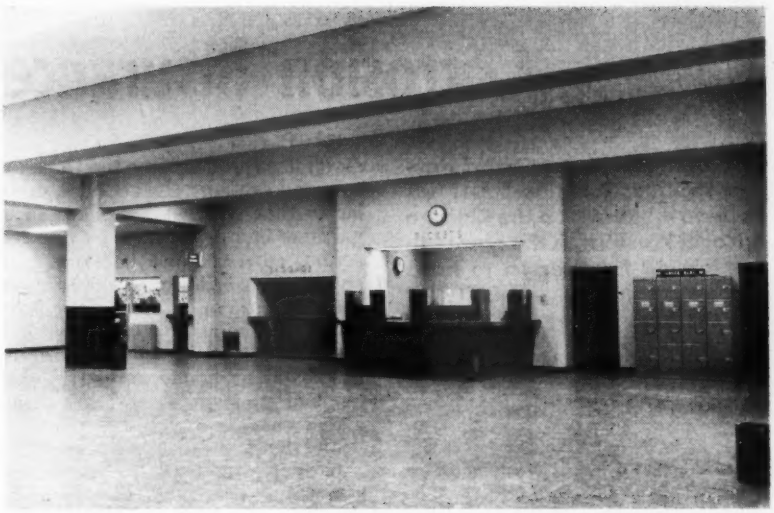
The enlarged waiting room was freed of all the old cast iron columns by installing steel ceiling beams spanning between the wall and structural columns. Other changes included the installation of a bank-counter type ticket office, the replacement of the former incandescent lighting with fluorescent fixtures of the flush type in the ceilings, the installation of modern toilet facilities, and the complete refinishing and redecorating of the waiting and other public rooms. All walls are now plastered and all of the rooms have accoustical tile ceilings.

In the waiting room the existing wood floor was replaced with a concrete slab covered with vinyl plastic tile. In this room the walls are painted a rose tan, and the recess for the ticket office is painted a Wedgewood blue. The ticket counter is faced with walnut veneer plywood, and the counter is of solid walnut. Atop the counter

are partial partitions, also walnut faced, which contain panels of fluted glass. In the lunchroom the walls are painted a sunlight yellow, and in the baggage room they are beige.

Other interior features of the modernized station include mahogany trim, a new train board with white letters on a dark background, attractive directional signs, modern parcel-check lockers, and a heating system involving baseboard radiation using steam furnished from the local power company.

The old-fashioned wood settees have been replaced with more modern wood settees and leather upholstered chairs and sofas, all so arranged as not to interfere with the free movement of passengers through the station on their way to and from trains. Red and green colors are featured by the upholstered furniture.



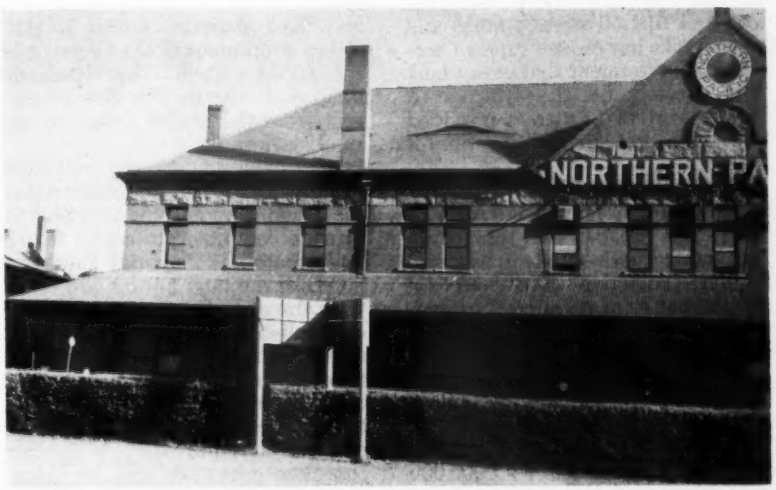
TICKET COUNTER, of the open type and featuring walnut veneer finish, is at location formerly occupied by one of the old fireplaces.

Exterior Also Improved

The exterior of the station has also been greatly improved in appearance. On the street side a commodious, glass-enclosed entry has been placed at the main entrance doors to the waiting room, and at the waiting-room end the window area in the front wall has been greatly enlarged. Both the entry and the new windows have aluminum sash and trim. An old-fashioned canopy on the street side of the structure has been replaced with a modern canopy with an aluminum facia and a plywood ceiling. The new canopy is supported by steel rods anchored to the brick walls. Windows of the baggage room in the front and end walls have been filled with glass block above ventilating sash.

Ceramic tile in a pale green color was applied to the exterior walls of the building up to the second-floor level, and on the street side the existing masonry base course was somewhat reduced in height. Where ceramic tile was not applied to the brick walls they were cleaned and painted green to match the tile. The old masonry trim was cleaned by sandblasting. The existing slate roof was not disturbed but it is expected that it will be renewed in the not too distant future.

This modernization project was carried out under the general supervision of L. B. Curtiss, architect of the Northern Pacific. H. C. Whitehouse of Whitehouse and Price Architects of Spokane was consultant architect. All work was done under contract.



BEFORE MODERNIZATION the exterior of the station was dominated by old-fashioned metal canopy. In other respects also the structure showed its age.

STATION EXTERIOR now features modern canopy and glass-enclosed entry. Brick was faced with tile up to second floor and cleaned and painted above that level.

Corrosion Insurance for Oil Storage

Cathodic protection of storage facilities for diesel fuel has become a "must" on the Chicago & North Western. A thirty-month test period is reported to have demonstrated the reliability of this method, with no down-time for repairs.

By B. D. Allison
Electrical Engineer
Chicago & North Western
Chicago

● The application of cathodic protection to prevent corrosion damage to diesel fuel-oil storage tanks and water tanks has proven such an economical investment that every tank now erected by the Chicago & North Western System is provided with such protection at the time it is installed.

Until about two and a half years ago the fuel storage tanks were of such small capacity that they could be mounted horizontally in concrete cradles; protection was therefore a simple matter of painting. The rapidly expanding size of the diesel locomotive fleet, however, has made it necessary to enlarge the servicing facilities, and to expand the fueling capacity of each servicing point. Nine fuel storage tanks, ranging in size from 150,000 gal. to 1,000,000 gal., have been erected vertically at eight division locations. The tanks were set on the ground with a sand pad about 14 in. deep under each one, and because of the relatively low load-bearing characteristics of the soil, all but two of the new tanks were set on concrete rings to prevent the tanks settling out of plumb or the bottoms losing support, with consequent bulging.

Inasmuch as the application of cathodic protection is a newly acquired requisite, it may be well to explain briefly the nature of corrosion of underground and submerged metal structures, and its cause.

Electrolysis Is Destroyer

Buried or submerged metal structures, or those resting on the surface of the soil as in the case of fuel tanks, are, of course, subject to corrosion, the rate of attack being accelerated by such factors as inequalities in the metal itself, soil acidity and the like. In many respects, the action is similar to that which takes place in a galvanic cell or battery. In this reaction, current flows between two poles with a resulting deterioration of one of them. As corrosion proceeds, particularly if accompanied by pitting, the metal structure is weakened or honeycombed to the point of uselessness, and costly replacements are required.

A cathodic protection system consists of five main parts: The structure to be protected, the environment surrounding the structure, a direct-current source, which usually is a rectifier, an anode system to distribute current to the structure, and the installation wiring to provide a continuous flow of current to the anode system. The schematic diagram illustrates this flow of current from the buried anode to the steel surface.

In designing a cathodic protection system, the first step is to determine the amount of current required to provide complete protection to the tank bottoms. Potential measurements of the tank bottom are taken with the aid of copper-copper sulfate half-cells. The electrical resistance of the soil likewise must be tested by means of a check test of the structure-to-soil potential. On the basis of these findings, the correct current requirements to provide complete protection can be calculated closely enough to serve as a bench mark and later adjusted as necessary after the system is in operation. The criterion that has been proved and accepted by authorities is a structure-to-soil potential of minus 0.85 volt, as measured with a copper-copper sulfate half-cell.

Reliability Must Be Maintained

We were aware of the high economic losses resulting from the destruction and replacement of tanks, product loss, disruption of vital services, fire hazard and other factors. We insisted, therefore, that since the larger tanks were erected on the ground, protection against corrosion must be a fixed part of the program. Being convinced, also, that an applied current, ground anode system was the most efficient and economical long-term investment, Harco Corporation was contracted to engineer and install cathodic protection for each tank as it was erected. In addition to the nine tanks now built and protected, two additional installations are allocated in the budget.

The tanks varying in size as they do, and the soil structure at each location having its own characteristics, each of the ground anode systems is individually engineered. The overall pattern is standardized, however, with individual installations differing from each other only in the number of ground rods required at each tank and the capacity requirements of the rectifier to carry the load demand.

At each tank location, excepting two, three 3-in. by 60-in. "National" graphite anodes are placed vertically in the ground in accordance with accepted practice, surrounded by "coke breeze" or prepared backfill to increase the effectiveness of each anode. The anodes are placed at the proper calculated distance from the tank. The positive side of the pole-mounted rectifier unit is connected to the anodes, which are interconnected, while the negative side of the rectifier take-off is bonded to the tank, thus establishing a continuous electrical circuit flowing from the anodes to the tank. The other two tanks are protected by six 3-in. by 60-in. anodes; the larger number being necessitated by the high resistivity of the soil.

Installations Maintenance Free

The rectifier unit provided for each tank is designed to provide years of trouble-free service. It consists, essentially, of an alternating-current power line with input switch and fuse or circuit breaker, a transformer to reduce the alternating-current line voltage, and the rectifier. The transformer has several low voltage windings which lead to the adjusting blocks; this secondary voltage then goes to the rectifier stacks where it is changed to direct current. The direct-current stack output is fed through an ammeter and voltmeter and then to the output terminals. The positive wire is always connected to the anodes and the negative to the structure being protected.

The system is set at a recommended amperage and this should be maintained at all times. The ammeter is a visual means of checking

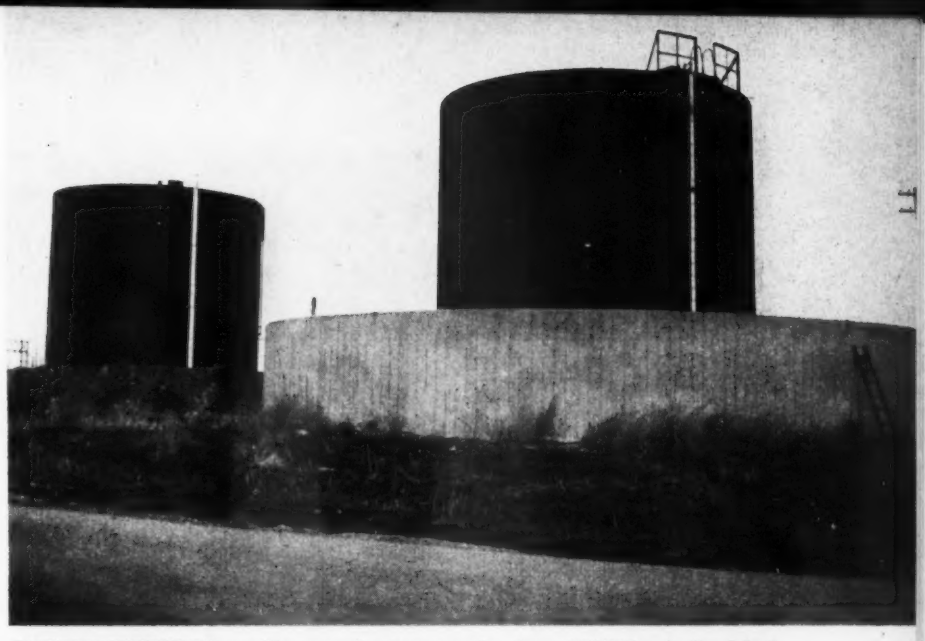
the current flow, which is subject to small adjustments from time to time as the protected surface polarizes by becoming covered with a hydrogen film, or as the anodes deteriorate. The design life of graphite anodes generally is ten or more years and no maintenance is required.

Each year the system should be checked with a copper-copper sulfate half-cell and a high resistance, low-scale direct-current voltmeter (100,000 ohms/volt, 0-1 or 0.5). These readings are a periodic cross-check of the monthly readings to verify the proper amperage setting of the unit.

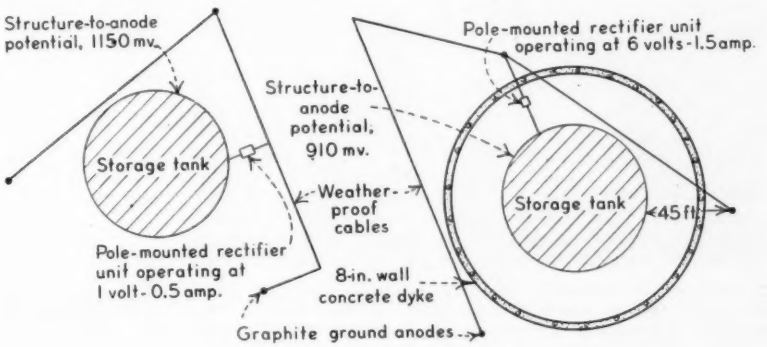
Water Tanks Different Problem

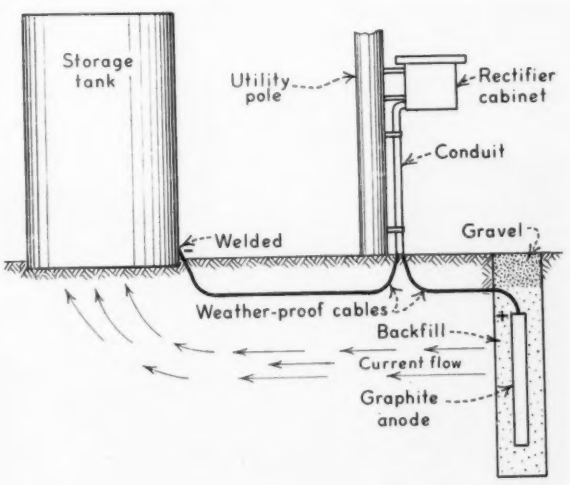
The railroad also has applied impressed-current cathodic protection to some thirty water tanks, ranging in size from 47,000 to 150,000 gal. each. These installations differ from the fuel storage tanks in that the graphite anodes are inside of the tank, and generally are of a smaller size than used for ground bed systems. Since most water tanks freeze, these anodes are designed for a one-year life; they either are replaced in the spring when ice danger is passed, or they may be removed in the fall and replaced in the spring. For water-tank protection, likewise, a separate rectifier is used at each tank. Small adjustments in the rectifier output setting may be required from time to time since the composition of the water may change seasonally and the water level in the tank is not constant. A water tank unit should always be adjusted for proper amperage output with the tank full of water. In general, the same meter reading schedule and regular checkouts of the system are followed as with fuel tanks.

Our chief interest in applying cathodic protection to water tanks is to keep maintenance costs at a minimum and to eliminate tank repair or replacement.



CATHODIC PROTECTION provides corrosion insurance for these 150,000 gal. diesel fuel oil storage tanks on the Chicago & North Western at Boone, Iowa.

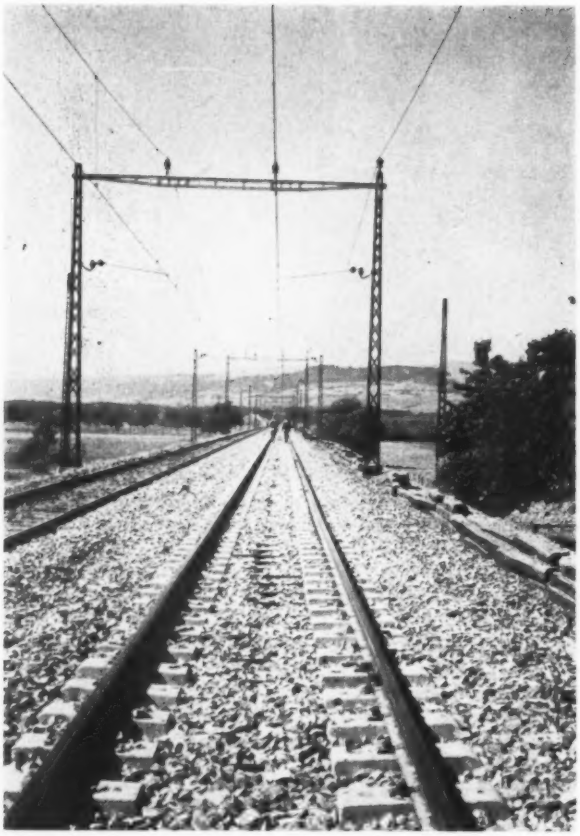




ABOVE—Direct current is supplied from a pole-mounted rectifier unit to a series of graphite ground anodes, strategically spaced around the tank and connected to each other and the rectifier by means of a buried weather-proof cable. RIGHT—Closed circuit is completed with a connection between the rectifier and the tank. This permits flow of current from the anode to the tank through the soil reversing the normal corrosive electrolytic action between tank and ground.

Economic Savings Real

The economic benefits of cathodically protecting diesel fuel storage tanks are very real and yet difficult to reduce to a dollars-and-cents basis in the absence of comparative operations. The erection of large tanks on the ground is a new practice with the Chicago & North Western. At the end of about 30 months of operation we know that maintenance has been a negligible factor, and that we have not had the tank leaks, product loss, repair expense and service interruptions that plague the owners of unprotected storage tanks. The small installation cost of an impressed-current, ground anode system, and the minor expense of operation and routine checking are a modest sum to pay for such trouble-free fuel tanks.



A NEW TRACK DESIGN, designated "Elastic" track, has been developed by the French National Railways. The "elastic" feature of the design is primarily in the fastenings and a rubber tie pad which can be used with either wood or concrete ties. The fastenings include spring clips which, when the bolts (screw spikes with wood ties) are tightened, press the rails with considerable force into the rubber pads. The concrete ties are two reinforced-concrete blocks, one for each rail, tied together by a metal tie-bar.

MULTI-PURPOSE GRADALL digs drainage tunnel under track serving the Warner & Swasey Co., manufacturers of the machine, at New Philadelphia, Ohio. After trenching up on both sides of track, the operator tunneled under halfway and then dug through from the opposite side.

News Briefs in Pictures . . .

NICKEL PLATE uses Caterpillar HT-4 Shovel with angle grader to push back coal along stockpile track, so that coal will flow freely from cars. Tracks are to be raised to height of 12 to 15 ft., permitting easier unloading and stockpiling.

WHAT'S THE ANSWER? . . .

. . . a forum on track, bridge, building and water service problems

Torpedo and Fusee Safety

What safety precautions should be observed when carrying torpedos and fuses on motor cars? When storing them at tool houses? Explain.

Must Be Conveniently Located

By M. A. NUGENT

Superintendent of Safety,
Southern Pacific, San Francisco, Cal.

Torpedoes and fusees carried on motor cars should be stored in a suitable container preferably of metal construction. The container should be designed to hold not only fusees and torpedoes but whatever flags are necessary so that all required flagging equipment will be together in the same container. Such containers should be, as far as possible, in the same location on all motor cars and in such a position that the contents can be quickly removed in the event of an emergency. Every precaution should be taken to see that loose torpedoes are not placed in tool boxes or tool trays or on any other part of the car where they might come in contact with tools and materials and become accidentally discharged. The same precautions should be taken with fusees, as exposure to the weather, oil or grease may cause them to become unusable. Only the minimum number of torpedoes and fusees that experience indicates are necessary should be carried, and they should be inspected frequently to insure that the proper number are on hand and that they are in good condition.

In tool houses, torpedoes and fusees should be stored in their own separate containers, which should be so located that they will be kept cool and dry. The containers should be of such design as will discourage the placing of any other material in them. Again the minimum number required should be kept on hand on a consumption basis so that carrying over of old stock will be avoided as much as possible.

Keep Away from Children

By A. V. ROHWEDER

Superintendent of Safety & Welfare,
Duluth, Missabe & Iron Range,
Duluth, Minn.

As standard equipment on all motor cars, a metal container for fusees and torpedoes is provided. This container is mounted at the rear of and under the driver's seat. Our flagging rule requires all operators to have not less than six torpedoes and at least four or more fusees. Our containers will hold six fusees and twelve torpedoes. At all tool and motor-car houses metal containers are provided for additional supplies. These containers are mounted on the wall and have a close fitting cover, and are located so that they are beyond the reach of children.

In addition to our flagging-rule requirements, we require a motor car that accidentally explodes a torpedo placed on the track by the operating department or other employees, to replace the torpedo immediately.

Keep in "Flagging Can"

By S. D. COULTON

Assistant Superintendent of Safety,
Nickel Plate, Cleveland, Ohio

A tin can with a tight cover is used on motor cars and in tool houses. This is called by many a "flagging can." The reason we use this is to keep the fusees and torpedoes dry on the motor car and free from danger of being ignited

---

Answers to the following questions are solicited from readers. They should be addressed to the Whats' the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the May Issue

1. What advantages are there in cropping relay rail? Disadvantages? Explain.

2. The large glass windows in control and interlocking towers are frequently tilted in at the bottom to reduce the glare from outside objects. What can be done to eliminate the objectionable interior reflections present when the interior lights are turned on at night? Explain.

3. When transporting laborers by highway trucks, what safety precautions should be taken? On whom should the responsibility rest for their safety? Explain.

4. Are supersonic sounding devices adaptable to investigations of scour at bridge piers and abutments? What types of equipment are most effective for this purpose? Explain.

5. Does the use of diesel locomotives increase the need for rail and flange lubricators? Why? Explain.

6. What is the best procedure for repairing a broken or leaking underground water main? Explain.

by a fire which might break out in the vicinity of the motor-car tool house.

Prevent Unauthorized Use

By Assistant Engineer

Torpedoes and fusees should at all times be kept so that unauthorized persons do not have access to them. Persons unacquainted with their dangerous properties, when improperly used or handled, have no business with either item. Proper storage should also be provided so that any danger of fire or explosion is eliminated as far as practical. Storage should also insure against mechanical wear or deterioration.

Torpedoes carried on motor cars in a careless manner may lead to a serious injury. Neither item should be carried loose in the tool tray or in a tin can as is sometimes done. A case occurred in which a bridge-gang motor car collided with a section car in mountainous territory causing the torpedoes, which were in a tin can near the front of the bridge gang car, to explode. One bridge man lost a leg as a result. Since then a two-compartment box made of sheet steel has been furnished. The box is usually bolted to a side board of the car below the deck and near the rear of the car. One compartment is fairly small for the to pedoes and the other of a length to accommodate the fusees. An extra red flag or time card may be kept with the fusees, while the torpedoes are usually cushioned with a little waste. Nothing else is permitted in the box. A sliding metal cover is provided with means of locking with a padlock.

By the means above, the torpedoes and fusees are protected from weather, unauthorized handling and from derailment or collision hazards as well as can be done. This also prevents the men from playing with the fusees and accidently lighting them when such action is not proper. The box also protects against tools or materials falling or being thrown on them.

In tool houses torpedoes and fusees still must be guarded against something being thrown on them. A common practice which seems adequate consists in mounting separate wooden bins on the side of the toolhouse for storage. This gets the items up off the floor keeping them dry and from being kicked.

It is important in either case to prevent mechanical wear or deterioration which might remove the tabs from the torpedoes or lose the caps from the fusees. I have seen fusees which were useless because the igniting powder had been knocked off the end.

Maintaining Fire-Protection Equipment

How often should fire-protection facilities and equipment be tested? How and by whom should such tests be conducted?

Constant Vigilance Required

By B. M. Whitehouse
Chief Fire Inspector,
Chicago & North Western, Chicago

Fire protection covers a wide variation in types of structures and the inherent hazards connected with the various uses to which they are subjected; therefore, many different types of protection are required. I shall give you my views regarding the most common types of protection. Water supply is probably the most important and the water mains should be watched continually for leaks, obstructions, clogged intakes and any other defect.

Fire hydrants should be inspected for defects, worn threads and drainage, at least twice a year, when they should be flushed to assure there are no obstructions in their supply lines. Tests should be conducted and repairs made, by competent water service employees.

Cotton rubber-lined fire hose should be hydrostatically tested once a year, by competent water service employees, at the pressure to which it would be subjected in actual fire service. At the same time, it should be inspected for defects and worn coupling threads.

Unlined linen fire hose should never be subjected to wetting except in case of fire. After it has been wet or has been in service for a period of ten years, a typical section should be hydrostatically tested to the pressure it would be subjected to in actual fire use and the condition determined in that manner. Otherwise keeping it clean and avoiding sharp bends or kinks is sufficient. It should be inspected for defects at least once a year.

Nozzles should be inspected at the same time fire hose is inspected. The condition of threads, gaskets, any distortion or other defects noted and repaired or replaced as required. Screens in fog nozzles should be cleaned at the time of inspection and after any use or test. Combination fog and solid-stream nozzles should be cleaned and the movable parts kept in a condition that will permit easy adjustment.

Carts and reels should be inspected whenever fire hose is inspected. Defects should be noted and replacements or repairs made by competent employees. Hose threads, adapters if used, hydrant wrenches, spanners, gaskets and other small items of equipment should be noted as to condition and ready availability.

Fire alarm systems should be tested at least once a month by a competent electrician. More frequent tests are advisable if an electrician is available.

Sprinkler systems should be tested at least once a month to assure that they will function properly. This test should be made by an electrician or fire marshall as sprinkle equipped structures are usually in large terminals or shops where competent employees are available.

Water barrels on bridges should be inspected by supervisors at least once a month and by track forces frequently. Buckets should be available and barrels full of water at all times.

Water barrels at buildings, material yards, docks, etc., should be inspected daily by employee occupants of any location and by agents and supervisors, shop superintendents, trainmasters and other traveling personnel whenever they have opportunity to do so. They should note that buckets are readily available.

Hand fire extinguishers and wheeled fire extinguishers are of a number of types and kinds and are usually assigned to permanent locations. They should be observed

daily by occupants of the locations in which they are placed to see that they have not been removed, and that they are ready for immediate use if required. It takes but a moment to casually inspect such units. The officer or supervisor in charge of any location should inspect units at least once a month and see that they are being properly maintained, and should be held responsible for their condition. Some of the most common types are further commented on as follows. Soda-acid and foam extinguishers are subject to freezing and should not be placed in freezing locations. They require recharging annually and this is usually done by water service employees but may be done by employees of other departments at some of the larger shops, storehouses, etc. Inspections should cover condition of hose, nozzle, cylinders and whether or not recharging is up to date. They should be hydrostatically tested about every five years by a qualified employee, provided with proper equipment for making the test. This is usually accomplished by sending them to the shops on an exchange basis. Carbon dioxide (CO_2) extinguishers should be inspected to note the condition of hose and nozzle and whether or not the seal wires have been broken. If this has happened the extinguisher should be weighted in accordance with instructions printed on the manufacturer's name-plate. If weight is lower than called for, the extinguisher should be recharged.

All dry-chemical extinguishers should be inspected to note the condition of hose, nozzle, any clogging of hose, broken seal wires and defective parts. If seal wires have been broken a thorough inspection must be made to determine whether or not the CO_2 cartridge has been punctured and if the cylinder is filled with dry chemical. It is important to keep the hose clear of obstruction. This can as a rule be determined by bending the hose sharply at the connection near the bottom. If it cannot be bent easily it should be removed and cleaned. This clogging is caused by faulty operation. If, after use, the extinguisher had been inverted and the hose blown out in accordance with the instruction, this could not happen.

Pump tank extinguishers, usually 2½ or 5 gal. capacity, if placed in freezing locations, should be filled with an anti-freeze solution; otherwise, plain water is all that is required. Inspections should cover condition of hose, nozzle and whether or not the plunger is stuck. It is a good idea to move the plunger a couple of times, discharging the liquid back into the tank.

Vaporizing liquid extinguishers (carbon tetrachloride) are of two types—"hand-pump" and "pressure." Pump-type extinguishers should be inspected to see that they are full of liquid, that plungers are not stuck and that the discharge outlet is not clogged. The pressure type should be inspected to see that they are full of liquid, that the hose and nozzle are in good condition that the air pressure is up to the "full" mark on the dial.

Generally there is nothing difficult with respect to inspection, operation or maintenance of fire extinguishers as the printed instructions on the units themselves are complete and all that is required is to follow them.

In the case of fire-protection generally proper maintenance cannot be over-stressed. The responsibility should be placed on those individuals who are in charge of the different properties, namely, agents, shop superintendents, general foremen, storekeepers, roadmasters, etc. The actual work may be delegated, by them, to their subordinates as they see fit, but they should be held responsible to the management.

Designated Employees Should Inspect

By John H. Upham

Assistant Engineer of Water Supply
Louisville & Nashville, Louisville, Ky.

Since there are so many different types of fire protection equipment, one set of rules for testing will not apply to all. In general, everything should be tested at least annually and this test should be made during the fall months so that all facilities will be in good condit on for cold weather. The test should be conducted on line of road by a designated man in the maintenance-of-way department such as a pump repairman, and at shops by an employee of the mechanical department, such as the pipe-fitter foreman. These tests and their results should be carefully recorded and reports made to a system official designated to coordinate fire protection and prevention.

The manner in which tests are conducted will vary with the type of equipment being tested. In the case of water barrels on timber bridges, a quick visual inspection to see that they are full, sound and complete with bucket is sufficient. On the other hand, a fixed mechanical foam fire-protection system on a large diesel oil tank requires elaborate preparations to prevent foam being discharged into the tank when it is tested. Also, an electrician is required where automatic equipment is involved.

In addition to the routine periodic tests of fire-protection equipment, it should be the direct responsibility of the mechanical and maintenance-of-way department supervisory officials to make visual inspection of such equipment during their ordinary inspection trips over their territories. Since the best fire protection is fire prevention, these officials and all employees must be alert to fire hazards and trained in the methods of eliminating them.

Plywood for Concrete Forms

What are the advantages of plywood as a material for concrete forms? Disadvantages? What precautions must be observed in its use for this purpose to obtain the best results?

A Highly Versatile Product

By Engineer Bridges and Buildings

Selection of the type of material to use for concrete forms must be based on economy and consideration of the surface texture desired on the finished concrete. Although one material may be more economical than others, surface texture requirements may prohibit its use. Plywood, because of its physical characteristics, has established a position of importance in concrete form construction. The desirable characteristics are: High strength to weight ratio, large panel size,

resistance to splitting, great rigidity, smooth surface, easily shaped, and minimum swelling and shrinking.

Plywood intended for concrete forms is so marked to differentiate it from ordinary type plywood. In form plywood, the laminations are bonded with a waterproof glue. Difficulties will arise if interior or common grades are subjected to the wet concrete. To further protect the form-grade plywood, it is advisable to oil the surface. Some plywoods are oiled at the mill where better oil penetration may be attained than on the job site. Oiling will more effectively retard raising of the grain and separating of the plies, and minimizes checking in addition to preventing bond between the plywood and concrete.

A recent development in the plywood industry is the introduction of a new product—plastic-surfaced plywood. A phenolic resin-surfacing, under heat and pressure, is applied to the plywood. This new surface is smooth, hard, water-resistant, and can withstand considerable abrasion. The bond between the plastic and plywood core is as strong as the bond between the wood plies. It is claimed that with care at least twice the number of re-uses can be obtained with plastic-surfaced plywood compared with the plain type.

While plywood may be obtained in numerous thicknesses, ⅜-in. or ¾-in. thicknesses are usual for formwork. On thicknesses less than ⅝-in., solid backing must be used to prevent form deflection between studs. As might be expected, it is usually more economical to use the thicker plywood without backing. However, where curved surfaces are to be formed, ¼-in. sheets have proved satisfactory.

Plywood ⅝-in. or heavier is nailed directly to the studs. Unless form details make it unavoidable, nails should not be driven through the sheets closer than one inch from the edges. Nails driven too close may split and tear the edges. If the plywood sheets are installed with the grain of the outer plies at right angles to the studs the load-carrying capacity of the sheets is increased. With the plies so positioned it is recommended that stud spacing be limited to 16 in. for ¾-in. and to 12 in. for ⅜-in. plywood. If the grain of the outer plies parallels the studs, spacings should be reduced by 2 in.

Any desired shape may be obtained since plywood is cut easily with either hand or power saw. Use of maximum size panels eliminates excessive jointing and improves surface appearance. Edges of the sheets must butt tightly to eliminate unsightly fins and to prevent leakage of the cement paste which may result in honeycomb. If a fine saw is used and care in workmanship exercised, the cut will be sufficiently smooth to obviate planing the edges. Joints must be supported along their entire length to prevent displacement of the panel edges. Small wooden wedges driven between studs and plywood will bring the sheets into alignment.

All plywood, particularly the plastic-surfaced type, by its nature creates smooth surfaces on concrete. However, because of the imperviousness of the panels, the tightness of the smaller number of joints, air and water are apt to be entrapped along the form faces, leaving small pits or holes. This can be overcome by careful spading, vibration and control of the rate of placing of the concrete.

Formwork economy often depends on the number of reuses that can be obtained. For exposed concrete where appearance is important, six or eight reuses of form-grade plywood in built-in-place forms can be expected if they are handled carefully. Surface scarring usually prohibits additional reuses for exposed concrete although the plywood is strong enough to be satisfactory for structural concrete. If plastic-surfaced plywood is used, double the number of reuses may be expected.

With panel forms that require no changes or only minor alterations the number of reuses may be increased 50 to 100 per cent. This could mean as many as 16 reuses for plain plywood and 32 for the plastic-surfaced. Proper detailing of formwork to facilitate stripping without damage to the plywood will materially increase its service life.

Large Cost Savings Possible

By F. H. Cramer
Bridge Engineer,
Chicago, Burlington & Quincy, Chicago

One of its most important applications of plywood springs from its efficiency as a material for the construction of concrete forms. In this use, plywood has made cost savings possible in the design, assembly, erection stripping and reuse of these forms.

To reduce the cost of forming concrete, a form system must be worked out before construction is started. This form system, to be economically justified, must incorporate various factors into its makeup. These factors include ease of assembly, strength, minimum weight, multiple reuse of material and low maintenance cost. Plywood adapts itself beautifully to these requirements, particularly in the construction of foundations, floors, bridges, dam tunnels and sewage plants. With the use of plywood the necessity of investing money in wasteful types of form lumber can be eliminated and there is no question but that concrete construction costs have been reduced by the use of plywood forms.

Plywood is made up of three or more laminations of thin sheets of wood in which the grain in successive layers is at right angles; it is quite warp resistant and will not split, thereby greatly increasing the reuse of the material. Boards made with a waterproof "glue" are suitable for concrete formwork. A great number of reuses should not be expected for concrete work since the surface of the board will become so marred as to make it unserviceable although still strong and satisfactory for form work. Plywood oiled at the mill and then reoiled on the job before being used will give better service than when treated on the job only.

If a panel plywood form can be used with only minor changes 25 per cent to 50 per cent more reuse of any sheathing or lining material can be obtained than in the case of built-in-place forms. Sheathing lumber, even when dressed and matched, is not always quite uniform in width. This may cause the joint lines to get out of level. Accurate alignment of concrete forms is necessary, and a great amount of care exercised in securing good alignment is time well spent. When stripping the plywood forms care should be taken not to break the corners or cause surface damage so that maximum reuse of material can be obtained.

Uses Salvaged Plywood

By P. X. Simpson
Bridge & Building Supervisor,
Northern Pacific, Tacoma, Wash.

We have not used any new ply-

wood for forms, but have used considerable second-hand plywood which was salvaged from dismantled freight cars and this has worked out very successfully. It makes a stiffer form, reduces labor costs and also makes a tighter form. We have made no attempt to salvage the old forms.

Emergency New Tie Stocks on Sections?

To what extent is it desirable to maintain a stock of new ties on each section for use in emergencies? What factors determine the number needed for its purpose? Explain.

Store Centrally

By J. W. Diffenderfer
Supervisor-Track, Pennsylvania
Johnstown, Pa.

Anyone who can multiply, even in round figures, would begin to get into some fairly large quantities if he allotted as few as 100 emergency crossties to each section, and totalled the number of ties for each subdivision, then for each division, and finally the number for an entire railroad. Yet, 100 ties could scarcely take care of a serious emergency that would demand the stocking of quantities of emergency ties all over a railroad. Serious wrecks, washouts, and catastrophies usually demand more than the 100 ties that we have arbitrarily chosen as a figure. Incidents of a lesser nature require only a few ties and do not necessitate the stocking of quantities of ties at every toolhouse and fence post over an entire railroad.

Continuing the multiplication, the totals of these quantities of ties must be multiplied by their individual cost, to awake many to the seriousness of the matter of stockpiling material at a multitude of locations over a railroad. A factor, however, that is often overlooked in considering such quantities of material, but which represents costs almost as staggering as the cost of the ties themselves, is the handling and distribution cost of piling the emergency ties at outlying locations.

The handling of ties for emergency use to outlying locations is costly any way you want to look at it. If work train use in the distribution is to be avoided, cars must be ferried from one location to another, resulting in costly car movements and switching. Even though storage locations may be accessible to highway vehicles, handling by highway trucks at each location may run the handling cost of each tie to a figure as high as the cost of the tie itself. If, to reduce the cost per unit of handling emergency ties, the ties are stored in carload quantities, then the inventory of ties held for emergency purposes becomes tremendous.

When a small quantity of emergency ties is held on a section, there is a great temptation for the section foreman to use his own definition of an emergency. Really, you cannot blame him when he uses a supply of the emergency ties to remove some bad ties from track that, had they remained, might have caused conditions leading to a derailment. So long as the ties are available, whether earmarked for emergency or not, there will be the tendency to make use of them, and who are we to say that the foreman is not justified in doing so? Thus, it is difficult to control tie use and assure oneself of a continual supply of emergency ties at each section headquarters.

What is the solution? We need a situation, wherein tie handling is held at a minimum, where there will be a sufficient supply of ties to meet every emergency large or small, where ties will be readily accessible for use over a specified territory, and where control of the emergency stock can be maintained, and use of the emergency ties determined by the supervisory officer in charge of the subdivision or district, and yet not have too large a quantity of ties for emergency use only.

For ordinary tie renewals and track rehabilitation, ties are most efficiently and economically distributed directly from the cars on which they are received to the location along the track where they are to be used, generally by work train service. If this proves the best for the every-day situation, why not do the same for the emergency situations, as well?

The situation best adapted as a solution to this problem is the creation of an emergency supply of ties, in a carload quantity, at the headquarters of each subdivision or district, usually comprising ten or fifteen sections. These should be held for emergencies in an easily unloadable low-side or drop-side gondola especially designated for emergency tie purposes. These ties could be handled quickly by work train or wreck train to any emergency location and unloaded directly, as needed, at the location where they are required.

Since the most common emergency in which tie damage exists occurs at wrecks, the logical place for this emergency car of ties is in the wreck train consist itself. Whether one tie or 200 are needed, the ties with the wreck train are always available. Since the wreck train is on the scene before work trains and other outfits are permitted to move, there is no problem in getting the ties to the location required. The location of wreck-train headquarters at a point easily accessible by highway truck will permit handling of ties by that method when that is preferred.

Although it has been done many times, there is no more reason to ruthlessly throw away money during an emergency than at any time. Why not use the carload emergency tie method and cut costs by keeping tie inventories low, avoiding unnecessary tie handling, and distributing emergency ties directly to the locations where they are needed, and at the same time assure oneself of a full supply of emergency ties readily available at all times?

Conditions Govern Locations

B. G. W. Miller
Engineer Maintenance of Way
Canadian Pacific, Toronto, Ont.

A stock of new ties should be retained on each track section so that the track forces may replace the old ties when surfacing. Frequently the number of ties allotted to a roadmaster for annual renewal is below average and the foreman must pass up ties during his annual renewal which should have been taken out. Later in the year, these ties can be replaced when track is

being surfaced or when crossing planks are being replaced. At that time ties can be replaced more cheaply than when annual spot renewals are made. The general condition of ties on a section and the delivery date for the next year's ties will determine the location and number to be stocked. As a rule there should be less than 10 per cent carryover at the end of the year.

While it would be helpful if a substantial number of ties were always immediately available in case of derailment or other emergency, this does involve added expense to the railroad, as more ties than are actually necessary would have to be carried over from year to year.

The auxiliary or emergency equipment held in most terminals should carry sufficient ties to take care of a few rail lengths of track damage. If the emergency is serious insofar as ties are concerned, a supply can usually be secured from the nearest terminal, from a nearby treating plant or by diverting tie cars which are in transit.

The main feature to consider in this problem is the question of cost. If we have an investment in surplus ties that is not paying its way, then that pile of ties should not be retained. On the other hand, in areas where emergencies have occurred frequently in the past, it is good insurance to have a stock of surplus material on hand for opening the line. The requirements for each area must be dealt with on its merits as no hard and fast rule can be established.

Sections Should Be Supplied

By General Roadmaster

A provision should be made for a reasonable stock of new ties to be held on each line section during the remainder of the year after the current tie-renewal program has been completed, and to be used for emergency repairs, such as replacement of broken ties and to restore track damaged by minor derailments. In yards and terminals a larger stock should be carried as the frequency of their being needed is greater, also a stock of assorted length switch ties should be held in yards. Practically all railroads carry a car of ties with their wrecking derrick for use in restoring track torn up in any derailment where a wrecking derrick would be required.

Because of the present cost of ties and the desire to keep inventories to a minimum, a study should be made to determine an average for the number of ties that might be needed. In my opinion, for line sections somewhere between 35 and 50 track ties would be a reasonable stock, and for yard sections between 250 and 500 ties, depending on the size of the yard, and I would also carry from 50 to 100 pieces of assorted switch ties. I do not think these stocks would be so large as to be unreasonable; they would take care of practically any emergency needs that might arise.

Heating and Ventilating Diesel Shops

What are the essential requirements of an adequate heating and ventilating system for diesel shops? What types of exhaust and ventilating equipment will best meet these requirements? Explain.

Continuous Ventilating Duct

By G. B. Anderson
Assistant Chief Mechanical Officer
Chicago & North Western, Chicago

We have tried many different types of compromise systems and have come to the conclusion that there are only two ways of meeting the problem. One is to supply copious forced-air heat (air taken from the outside of shop), admitted at the shop floor level. All shop air is exhausted through a continuous duct or smoke jack which extends the entire length of each track over the top of the locomotive and is about 6 ft. wide. The exhaust of air is also assisted by blowers.

The other solution is to provide smoke jacks which fit directly over each individual stack of each type of locomotive. To our knowledge the latter solution has been used successfully only at shops or roundhouses where all of the locomotives being handled were of the same type.

Provide Forced Warmed Air

By J. S. Cooper
Assistant Chief Engineer,
Ontario Northland, North Bay, Ont.

The requirements for an adequate heating and ventilating system vary considerably, depending on the climatic conditions at the particular location of the facility. These conditions directly affect the rate of air change in summer and the heat loss in winter.

Being one of the most northerly railway operations on the continent, we are faced with extremely low temperatures and heavy snow in winter, while summer heat is not too serious a factor. Under these conditions, we have found the following requirements desirable and satisfactory for a heating system in modern diesel shops which we have recently completed.

In the service shop, or low bay section, the base load is carried by low-pressure steam unit heaters placed at intervals along the full length of the outside wall and also along the center row of columns adjacent to the repair shop. Heaters are also installed in pairs over each large rolling entrance door to replace the large heat loss at these points.

Supplementary forced warm air is supplied to service pits and the drop pit from a forced draught fan, fitted with steam coils at the inlet, and having provision for drawing both outside and recirculated air in any required proportion. This arrangement fulfills two very necessary requirements:

(a) A sufficient quality of warm air at low level to provide a warm zone at floor level and in the pits for service personnel working on trucks and under carriages.

(b) A high-temperature air stream deflected upwards from louvres in the pit walls for thawing ice and snow from the undercarriages in winter, thus permitting adequate inspection and maintenance to be carried out within a reasonable time.

The base load in the repair shop or high-bay section is carried by low pressure steam unit heaters along the walls and over large doors for general comfort require-

ments. Supplementary heating from two "Torridor" projection units, manually controlled for use under extreme conditions, is provided. In the adjoining offices, wash rooms and workshops a thermostatically controlled forced hot-water system, supplied from a low pressure steam converter to finned convectors and unit heaters in various spaces is provided.

The type of exhaust and ventilating equipment which will best meet the requirements of the service shop must embody two important features, sufficient exhaust capacity over the service pits to remove all exhaust gases from main engine and steam generator outlets based on full power operation and automatic thermostatic control to avoid excessive heat loss.

We have developed such a system, fulfilling all requirements and employing continuous ducts over service pits, constructed of asbestos-cement board mounted on a steel frame. The duct is connected to hoods and motor-driven exhaust fans at approximately 40-ft. centers, exhausting through the roof deck and controlled by thermostats in both upper and lower zones. These are activated by temperature rise and fall from exhaust gases. Such a system is completely automatic and serves all locomotives regardless of their location on the pit. Heat loss is reduced to a minimum and replacement heat and air is supplied from the pit.

In the repair shop general ventilation is provided by 36-in. diameter motor-driven exhaust fans located in the roof deck. These are adequate for removing exhaust gases from locomotives which are infrequently operated in this section of the building.

Exhaust systems installed for the auxiliary workshops, offices and wash rooms use one fan to serve several facilities through an overhead duct system with louvres in each space, for which either manual or automatic control is provided on a time cycle.

An independent manually operated system is provided in the filter and parts cleaning room with individual hoods and ducts over various vats and machines connected to a common fan exhausting outside. All fumes and moisture laden gases are removed at the source, thus avoiding their escape into the room to the discomfort of personnel and the corrosion of machined parts.

Locating Emergency Rails

What are the advantages of providing spare rails at intervals along the track for emergency use? Where this practice is followed, how far apart should these rails be placed? Explain.

Concentrate at Terminals

By George S. Crites
Division Engineer (Retired)
Baltimore & Ohio, Baltimore, Md.

It is very essential to have a stock of spare rails with accessories, along with a well selected assortment of switch parts, ready for emergency use in large yards or terminals. Such stocks must be located at salient points, outside the limits of paths, but at places from which they can be moved to locations where they are needed with the minimum of delay and effort. Repairs to damaged tracks in yards must be made expeditiously in order to avoid, insofar as possible, any undue delays to trains and disruption of schedules.

In terminals there should also be available and ready for quick movement, a stock of rail and accessories which might be needed when line or road emergencies occur. Often it is expedient and time saving to have such line or road rail loaded in suitable non-revenue cars for quick movement. With few exceptions, such emergency rail stocks will suffice. Usually, such stocks are nearby or attached to complete wrecking outfits.

There are situations which can arise in some locations where dependence upon emergency rail stocks in terminals would cause trouble. For such situations and locations, there should be a suitable stock of rail at the supervisor's headquarters, or at the places where work equipment is tied up, which can be assembled by suitable gangs and equipment for movement to the point where it is needed in case of emergency.

There is nothing on the railroads more haphazard and dangerous than trying to move rails on track cars with inadequate forces and without equipment along main tracks during emergencies. That is what happens when spare rails along the track have to be moved.

Place at Alternate Mile Posts

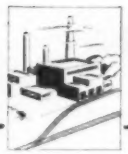
By Fred B. Miller
Section Foreman,
Pennsylvania, Thorndale, Pa.

I work for the Pennsylvania and during the past year we made a drastic change in the number of emergency rail on all sections. We used to keep two or more rails, depending on the weight of rail in track, at each mile post and at such other locations as we saw fit. There were an average of two rails at each mile post so that when we had a broken rail it was seldom necessary to truck a rail more than a half mile. This cut down to a minimum the time required to change rail on a night call.

The reason for now locating these rails at every other mile post is because on our main line tracks some of the rails were not used for years. This made it a costly operation to keep rail on skids at mile posts that were never used for an emergency.

On our freight lines the same policy has been carried out and so far we have not had any serious delays due to broken rails. On our freight lines we keep two different weights of rail at the mile post as our No. 1 track has heavy rail and our No. 2 track has a lighter weight rail for almost its entire length. In some locations where we have had rail that gives us more trouble than others it is necessary to keep more rail on hand.

When we find a rail in our walks over the section that we think should be changed before trouble arises, a repair rail is set off at this location by work train. My opinion is that emergency rail at every other mile post is sufficient to take care of broken rails unless a condition exists that requires them at shorter intervals.



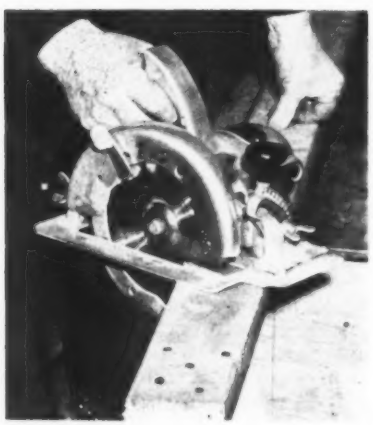
PRODUCTS OF MANUFACTURERS . . .

. . . new, improved equipment, materials, devices

RAIL ANCHOR SHIMS

TELEWELD, INC., Chicago, has announced the development of an assortment of rail anchor shims which it is claimed will permit the reuse of any type of rail anchor on new or used rail. Wear shims in $^{1}/_{32}$, $^{1}/_{16}$, and $^{3}/_{32}$-in. sizes are available for use in applying old anchors on new or used rail of the same weight as that for which the anchors were originally designed. In addition, adapter shims can be furnished for use in applying large-size anchors on rail which is smaller than that for which the anchors were manufactured. For example, 131-lb. anchors with proper adapter shims can be used on any smaller weight rail down to 110 lb. These shims are of high-tensile steel.

SHIM, before and after application.



IMPROVED HEAVY-DUTY UTILITY SAWS

THE REDESIGN of its 7-in., 8-in. and 9-in. heavy-duty saws to facilitate operations and speed accurate sawing in the building and construction field have been announced by the Black & Decker Manufacturing Co., Towson, Md. These saws, together with a new 6-in. heavy-duty adjustable saw designed for trim work, provide a complete line of this type of equipment.

The new features include an exclusive grip handle, which has been placed at the natural sawing position; a large lever arm for retracting the lower blade guard while making pocket cuts; and heavy-duty Universal motors specifically designed for power saving and improved visibility of the cutting lines and blades. Among other features claimed for these saws are large, sturdy shoes for good support and easy right or left-hand operation; full adjustment for depth or angle of cut; an instant release trigger switch and a telescoping lower blade guard for safe operation; and an auxiliary knob on the front of the saw to provide two-handed operation when required. The power cable passes out of the end of the handle, which eliminates interference with the operation or work material.

The 7-in., 8-in. and 9-in. models have two depth adjustments, front and rear, which permit the handle to be maintained at a comfortable operating position even in very shallow cuts. The 7-in. and 8-in. models can be set at 0-in. depth of cut, while the 9-in. model has a minimum cutting depth of ¼ in. The maximum cutting depth for the 7-in. saw is 2 $^{7}/_{16}$ in. (1 ¾ in. at a 45-deg. bevel); for the 8-in. saw it is 2 $^{13}/_{16}$ in. (2 $^{1}/_{16}$ in. at 45-deg. bevel), and for the 9-in. saw it is 3 ¼ in. (2 ⅝ in. at 45-deg. bevel). No load speeds are 4200 rpm, 4500 rpm and 3700 rpm for the 7-in., 8-in. and 9-in. models respectively.

What Our Readers Think

Fire Protection in Diesel Shops

New York, N.Y.

To the Editor:

We have reviewed with considerable interest the article which appeared in the November 1953 issue of *Railway Track and Structures* by W. S. Wicker, chief engineer of the Transportation Mutual Insurance Company, Philadelphia, Pa. As your magazine is influential in the railway field, we thought that you should correct an impression created by Mr. Wicker's article. In his discussion of fire protection in diesel shops he makes the following statement:

"So far as is known, sprinkler installations have not been considered except in a few older installations where fires in oil-saturated wooden buildings and platforms proved them to be not altogether satisfactory."

The facts are that there are many of these diesel servicing buildings and repair shops which are protected with automatic sprinklers, and it is generally recognized by fire-protection engineers and insurance authorities that the best defense against fire in these properties, as in others, is complete automatic sprinkler protection.

The fire loss generally in railroad properties of all types could be materially reduced, and the problem of maintenance, efficiency and proper service could be lessened, if the railroads used automatic sprinkler protection to a greater extent than is their present practice.

It is estimated that for the year 1953 the fire loss of this country will be in excess of a billion dollars and that does not include the indirect losses, many not insurable. In this enlightened period, it is wholly unnecessary that we must have a catastrophe such as the General Motors Livonia fire and the Cocoanut Grove night-club fire to awaken the public to the necessity of proper fire protection.

A. D. Bosch
Secretary
National Automatic Sprinkler
Fire Control Association

(*Continued on page 66*)

MORE Weed Killing Per Dollar With "HERBICIDOL"

There are today few railroads that do not use weed killing chemicals. And railroads today are figure minded.

Where several different types of weed killer are used, comparisons of cost per mile are studied with a critical eye. Many of these yearly cost sheets find their way into our office.

Without exception low cost per mile in favor of "Herbicidol" is shown on such records.

Frequently at conventions some maintenance official will stop at our booth and say, "I saw a job on the XXX Railroad—that's the kind of a job we want". And the XXX Railroad is a user of "Herbicidol".

The original "Herbicidol" was of poisonous base, but it is now available with non-poisonous formulation. Whether you contemplate placing a contract to include spraying or are interested in self service spraying, we invite exchange of information for your 1954 program.

READE EST 1883

READE MANUFACTURING COMPANY, INC.

JERSEY CITY 2, N. J.

WORKS: JERSEY CITY ● CHICAGO ● KANSAS CITY ● MINNEAPOLIS ● BIRMINGHAM ● STOCKTON

Letters to Editor (Cont'd)

Explains Statement on Sprinkler Systems

Atlanta, Ga.

To the Editor:

This refers to the letter from Mr. Bosch of the National Automatic Sprinkler and Fire Control Association in which he questions a statement made in one of my articles in the series on Fire Protection at Diesel Facilities.

There was no intent in the article to discount or disparage the advantages of automatic sprinkler installations. The reference was made simply to the installations in diesel repair shops with which I am familiar. So far as I have observed and have studied the articles on diesel repair shops throughout the country, the percentage of those in which sprinklers have been installed is rather small. If this impression is erroneous I would be very happy to be corrected.

The principal reason for the lack of sprinkler installations in many diesel repair shops, as far as I can learn, is that the largest values involved are in the diesel locomotives themselves; sprinklers on the high ceilings would not control fires inside the diesel locomotives nor in the inspection pits thereunder. The underside of the roof decking in diesel repair and servicing shops soon becomes coated with oily deposits which become hard and are difficult to remove. Cleaning at periodic intervals is necessary. Such deposits would no doubt coat the sprinkler heads and retard or prevent their operation, unless frequent cleaning is done.

If the Sprinkler Association can devise an installation which will be effective under the conditions existing in diesel repair and servicing buildings the provision of automatic sprinklers in such properties would very likely be given more consideration.

It would be interesting to learn just what percentage of the modern diesel repair shops and servicing buildings throughout the country are protected by automatic sprinklers.

W. S. Wicker
Chief Engineer
Transportation Mutual
Insurance Company

THIS MONTH'S NEWS
Railway Personnel

Engineering

R. R. Manion, maintenance of way engineer, has become chief engineer of the Great Northern at St. Paul, Minn. succeeding **H. J. Seyton,** who has retired. **W. J. Cruse,** engineer of track, has been named to succeed Mr. Manion as maintenance of way engineer. **L. W. Leitze** will replace Mr. Cruse as engineer of

R. R. Manion

track at St. Paul. **B. G. Anderson** has been named office engineer at Seattle, Wash., and **K. E. Wyckoff** division engineer at Spokane, Wash., succeeding **Fred E. Wiesner** and **B. E. Burr,** respectively, both of whom have retired. Mr. Anderson has been replaced as division engineer at Great Falls, Mont., by **Arlie Bornhoft.**

Samuel R. Hursh, assistant chief engineer—maintenance of the Pennsylvania, has been appointed chief engineer for the system, with headquarters as before at

Samuel R. Hursh

Philadelphia, Pa., to succeed **John L. Gressitt,** who has retired after 45 years of service. **Lester E. Gingerich,** chief engineer, maintenance of way, of the Central region at Pittsburgh, Pa., has been ap-

Lester E. Gingerich

Glenn A. Williams

pointed assistant chief engineer—maintenance to succeed Mr. Hursh at Philadelphia. **Glenn A. Williams,** assistant chief engineer, maintenance of way, of the Central region, has been promoted to succeed Mr. Gingerich, and **Leo W. Green,** division engineer at New York, has been named to Mr. Williams' former position at Pittsburgh. **Charles J. Code,** engineer of tests—maintenance of way, has been advanced to assistant chief engineer—engineer of tests, with headquarters as before at Philadelphia.

Everett E. Earl has been named to the newly created position of assistant to chief engineer for the Southern Pacific at Los Angeles.

W. J. Burton, formerly assistant to chief engineer of the Missouri Pacific, and more recently assigned to special duties at St. Louis, has retired.

C. R. Strattman, special assistant engineer on the New York Central at Cleveland, has retired.

William R. Jacobs, supervisor of work equipment on the Southern at Knoxville, Tenn., has been appointed assistant engineer at Charlotte, N. C.

C. E. Fleetham has been appointed district supervisor of bridges for the Rock Island at Des Moines, Iowa, replacing **R. R. Bragg,** who has retired. **L. E. Porter,** roadmaster at Limon, Colo., has succeeded Mr. Fleetham as assistant division engineer at Rock Island, Ill.

N. V. Back, engineer maintenance of way of the Toronto, Hamilton & Buffalo, has been appointed chief engineer with headquarters as before at Hamilton, Ont., to succeed **A. F. White,** who has retired after 41 years of service.

Norman Olsen, assistant division engineer on the Eastern division of the Pennsylvania at Pittsburgh, Pa., has been promoted to division engineer of the Cincinnati division at Cincinnati, Ohio, to succeed **W. N. Myers,** who has been transferred to the Lake division at Cleveland, Ohio, to replace **H. P. Morgan,** who has been moved to the Eastern division. **R. H. Smith,** supervisor of track on the Pittsburgh division at Derry, Pa., has been promoted to assistant division engineer on the Eastern division, and **Edward Wollett, Jr.,** supervisor of track on the Maryland division at Wilmington, Del., has been advanced to assistant division engineer on the Fort Wayne division at Fort Wayne, Ind., to replace **J. H. Ault,** who has been appointed assistant engineer, office of chief engineer—maintenance of way of the Western region.

R. J. Klueh, assistant engineer of bridges on the New York Central, has

been promoted to engineer of bridges with headquarters as before at New York. **D. P. Kinzel,** general supervisor of bridges and buildings, has been promoted to engineer of buildings, with headquarters continuing at New York. **C. E. O'Connor,** assistant engineer, has been promoted to engineer of bridges at Cleveland. **O. H. S. Koch,** assistant engineer, has been appointed assistant district engineer of structures at Detroit to succeed **E. A. McLeod,** who has been advanced to district engineer of structures. **L. H. Sharperklaus,** assistant engineer, has been appointed assistant district engineer of structures at Cincinnati, Ohio, to succeed **W. C. Schakel,** who has been promoted to district engineer of structures. **R. W. Orr,** assistant division engineer at Columbus, Ohio, has been transferred in that capacity to Springfield, Ohio.

K. Vavasour, assistant division engineer on the Edmundston division of the Canadian National at Edmundston, N. B., has been promoted to division engineer on that division to replace **E. C. Matthews,** who has been transferred to the Prince Edward Island division at Charlottetown, P.E.I, as division engineer and bridge and building master to succeed **C. W. Milton,** who has retired. **M. B. Martin,** assistant division engineer on the Moncton division at Moncton, N. B., has succeeded Mr. Vavasour at Edmundston.

Karl J. Wagoner

Karl J. Wagoner, assistant chief engineer of the Baltimore & Ohio, has been appointed chief engineer with headquarters as before at Baltimore, Md., to succeed **Alfred C. Clarke,** who has retired after more than 38 years of service

Edwin F. Wright

with the B&O. **Edwin F. Wright,** regional engineer at Pittsburgh, Pa., has succeeded Mr. Wagoner as assistant chief engineer at Baltimore, and **Milton S. Norris,** senior engineer at Pittsburgh, has been advanced to Mr. Wright's former position there.

W. H. Huffman, assistant to chief engineer of the Chicago & North Western, has been promoted to assistant engineer of maintenance, with headquarters as before at Chicago, succeeding **F. W. Creedle,** who has resigned to become chief engineer of the Ramapo Ajax division of American Brake Shoe Company. **C. E. Hise** has been appointed assistant to chief engineer replacing Mr. Huffman.

Benjamin Chappell has been named assistant chief engineer for the Canadian National Western region, suceeding **Emerson Morse,** who has retired. **Joseph Conrad,** district engineer, replaces Mr. Chappell as engineer maintenance of way at Winnipeg. **V. R. Cox** has been appointed division engineer at The Pas, Man., succeeding **M. B. Hanson,** who has been transferred to Vancouver.

John F. Davison, engineer of the Southern Ontario District committee on terminal performance of the Canadian National, has been appointed assistant to

(*Continued on page 72*)

Complete
BRUSH and WEED KILLING SERVICE

PIONEER in the improved right-of-way brush control

Spraying equipment specifically designed and proven for the purpose

LEADER in effective grass and weed killing control

- TCA
- OILS
- 2, 4-D
- PENTACHLOROPHENOL
- BRUSH KILLERS

For Your Railroad . . .

- PROVEN CHEMICALS
- TRAINED PERSONNEL
- SPECIALIZED EQUIPMENT
- RECOGNIZED EXPERIENCE
- INSURED RESPONSIBILITY

Producing . . .

MAXIMUM VEGETATION CONTROL ECONOMICALLY THROUGH EFFICIENT OPERATION

Spray Services *Incorporated*

Pioneers in Right-of-Way Spraying

P. O. BOX 5444 HUNTINGTON, W. VA.

Railway Personnel (Cont'd)

the system chief engineer with headquarters at Montreal, Que.

Track

O. E. Fort has been appointed to the newly created position of assistant division engineer for the Frisco at Chaffee, Mo. **C. A. Peebles,** roadmaster at Ft. Smith, Ark., has succeeded Mr. Fort as roadmaster at Springfield, Mo. **R. E. Catlett,** roadmaster at Hugo, Okla., has replaced Mr. Peebles at Ft. Smith. **R. J. McDiarmid** has been promoted to roadmaster at Hugo, and **Curtis Payne** has been appointed assistant general foreman B. & B. and W. S. at Tulsa, Okla., replacing Mr. McDiarmid. **D. L. Walker** has been appointed assistant roadmaster at Ft. Worth, Tex., and **B. J. Bishop** becomes assistant roadmaster at Chaffee, replacing **R. F. Lindsay,** who has resigned to become associate editor of *Railway Track & Structures.*

Donald Denio, supervisor of track on the Fitchburg division of the Boston & Maine at Greenfield, Mass., has been promoted to assistant division engineer on the Portland division at Dover, N. H., to succeed **Robert F. Garner,** who has been transferred to Greenfield to replace **John F. Reilly,** who has retired, after 52 years of service.

Association News

Northwest Maintenance of Way Club

The next meeting of the club will be held on February 25 at the Midway Service Club, 1931 University Avenue, St. Paul, with dinner being served at 6:30 p.m. The principal speaker will be Gerald M. McGee director of engineering research, Association of American Railroads.

Metropolitan Maintenance of Way Club

A regular dinner meeting of the club will be held at the Railroad-Machinery Club of New York, 30 Church street, New York, on Thursday, February 25. The program for the meeting had not been completed at the time this issue went to press.

American Railway Bridge and Building Association

President Lee Mayfield has called a meeting of the Executive Committee of the Association to be held at the Chicago Engineers' Club, Chicago, at 9:00 a.m. on March 15, one day before the opening of the convention of the American Railway Engineering Association at the Palmer House, Chicago. Arrangements have been made for the subjects committees of the B. & B. Association to hold meetings at Chicago during the A.R.E.A. convention. These committees have now been completely organized. Each of the committees has been assigned a sponsor who is an officer or a member of the Executive Committee of the association. The sponsors will assist the committees in preparing their reports.

Mississippi Valley Maintenance of Way Club

The February meeting of the club was scheduled to be held on Monday, February 8, at the Hotel DeSoto, St. Louis, with dinner being served at 6:30 p.m. A. K. Atkinson, president of the Wabash, had been engaged as the featured speaker, but at the time of going to press the subject of his talk had not been announced. In addition to the address by Mr. Atkinson, the program was to include the showing of a film entitled "225,000 Mile Proving Ground," which is a pro-

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 13-15, 1954, Conrad Hilton Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 16-18, 1954, Palmer House, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual Meeting April 26-28, 1954, Chalfonte-Haddon Hall Hotels, Atlantic City. W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—Next meeting, January 25. E. C. Patterson, secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—P. E. Odom, Secretary-Treasurer, Room 1008, Frisco Building, 906 Olive street, St. Louis 1, Mo.

National Railway Appliances Association—J. B. Templeton, Secretary, 1020 So. Central avenue, Chicago 44; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Roy M. Edmonds, Secretary-treasurer, 1221 Locust street, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 13-15, 1954, Conrad Hilton Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

duction of the Association of American Railroads.

The last meeting, held on January 11, drew an attendance of 219 members and guests. Membership of the club has now risen to 629.

Roadmasters' Association

A meeting of the Executive Committee of the association is scheduled to be held at the Chicago Engineers' Club, Chicago, at 9:00 a.m. on March 15, one day before the opening of the annual convention of the American Railway Engineering Association at the Palmer House, Chicago. In addition to conducting routine business the Executive Committee will hear progress reports from the three new standing committees that have been organized by the association. Arrangements are being made from the subjects committees of the association to hold meetings at various times during the A.R.E.A. convention.

Maintenance of Way Club of Chicago

The last meeting of the club was held on January 25 at Welty's restaurant in the Field building, Chicago. R. H. Egbert, engineer, maintenance, Toledo, Peoria & Western, was the principal speaker. He gave the results of an investigation he had made to determine the most effective practices for building up battered rail ends and engine wheel burns.

At the time of going to press the program for the next meeting, to be held on March 1, had not been announced.

American Railway Engineering Association

Following the annual meeting in March, seven new committee chairmen and six new vice-chairmen will take over the direction of committee work. The committee chairmen are all formerly vice-chairmen of their respective committees. An account of the changes follows:

Committee 6—Buildings. O. W. Stephens (chairman), assistant to chief engineer—maintenance, Delaware & Hudson, Albany, N. Y.; D. E. Perrine (vice-chairman), assistant chief engineer, Chicago & Western Indiana, Chicago. Mr. Stephens will succeed present Chairman J. B. Schaub, assistant engineer buildings, Illinois Central, Chicago.

Committee 7—Wood Bridges and Trestles. W. C. Howe (chairman), engineer of bridges and buildings, Bessemer & Lake Erie, Greenville, Pa. Mr. Howe will succeed present Chairman C. H. Newlin, bridge and building supervisor, Southern, Bristol, Va.

Committee 13—Water, Oil and Sanitation Services. H. L. McMullin (chairman), engineer of tests and water supply, Texas & Pacific, Dallas, Tex.; H. M. Schudlich (vice-chairman), engineer of water service, Northern Pacific, St. Paul, Minn. Mr. McMullin will succeed present Chairman G. E. Martin, superintendent water service, Illinois Central, Chicago.

Committee 16—Economics of Railway Location and Operation. H. B. Christianson, Jr. (chairman), assistant engineer, Atchison, Topeka & Santa Fe, Chicago; R. L. Milner (vice-chairman), staff engineer, Chesapeake & Ohio, Huntington, W. Va. Mr. Christianson will succeed J. W. Barriger, vice-president, Chicago, Rock Island & Pacific, Chicago.

Committee 17—Wood Preservation. A. J. Loom (chairman), general superintendent timber preservation, Northern Pacific, Brainerd, Minn.; W. C. Reichow (vice-chairman), engineer wood preservation, Great Northern, St. Paul, Minn. Messrs. Loom and Reichow were appointed chairman and vice-chairman, respectively, by the Board Committee on Personnel after the death on October 7 of Chairman W. F. Dunn, Sr., tie and timber agent, Southern Railway System, Washington 13, D. C.

Committee 24—Cooperative Relations with Universities. R. J. Stone (chairman), vice-president operations, St. Louis-San Francisco, St. Louis, Mo.; W. H. Huffman (vice-chairman), assistant engineer of maintenance, Chicago & North Western, Chicago. Mr. Stone will succeed present Chairman C. G. Grove, chief engineer, Western region, Pennsylvania, Chicago.

Special Committee on Continuous Welded Rail. L. F. Racine (chairman), chief engineer, Chicago, Indianapolis & Louisville, Lafayette, Ind.; C. E. Weller (vice-chairman), division engineer, Illinois

Association News (Cont'd)

Central, Chicago. Mr. Racine will succeed present Chairman H. B. Christianson, special engineer, Chicago, Milwaukee, St. Paul & Pacific, Chicago.

Supply Trade News

General

An agreement whereby the **International Harvester Company**, Chicago, will begin marketing two-wheel rubber-tired tractors for heavy construction work has been announced in a joint statement issued by Harvester and the **Heil Company**, Milwaukee.

Under the contract arrangement Harvester acquires Heil patents covering two-wheel tractors and, in addition, acquires design and manufacturing data. During the interim until Harvester is able to engage in actual production of the machines, Heil will supply two-wheel tractors to the parent company. Heil will also manufacture certain types of scrapers and wagons for Harvester during the period of the agreement, which is to continue for a number of years.

Two tractor models currently being built by Heil, together with scraper and wagon attachments, have been marketed as "Heiliners." These units will now be sold through International Harvester's Industrial Power division under the trade name "International."

Personal

Martin Perdue has been named to represent the **Kershaw Manufacturing Company** in equipment sales on the southern territory.

Mr. Perdue comes to Kershaw from the Jacksonville (Florida) Terminal Company where he was assistant to chief engineer. He has had fourteen years experience in maintenance of way work.

The **American Manganese Steel Division** of the **American Brake Shoe Company**, New York, has announced the appointment of **John Brandenburg** as vice-president in charge of sales, **William E. Crocombe, Jr.**, as central sales manager, and **John H. Baker** as district sales manager.

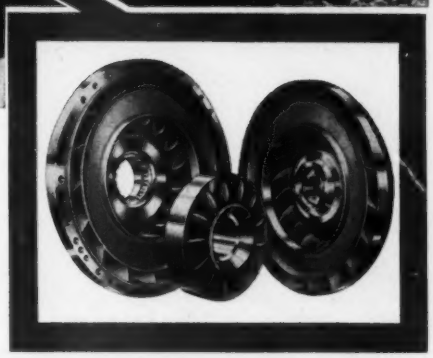
Mr. Brandenburg, who was formerly sales manager for the Asmco division, will head the company's sales office at

(*Continued on page 76*)

...Smoother power!
...Better performance!

with the NEW TORQUE CONVERTER

PAYLOADER®



The big, husky 1½ HM "PAYLOADER", the leader in the field, now further establishes its superiority with the extra advantages of a Torque Converter drive. Gives you extra power for tough going, smoother power at all times, more lugging power, more engine efficiency, for faster, lower cost material handling.

Combined with the 4 speed, full reversing transmission, the Torque Converter provides an unlimited range of automatically selected speeds to meet the load and operating conditions. Parts breakage and maintenance are less because shock loads are absorbed.

More than a year of field testing "on the job" gives you proven performance. It's the finest tractor-shovel available — and we'll prove it! Ask your "PAYLOADER" Distributor for a demonstration or write The Frank G. Hough Co., 751 Sunnyside Ave., Libertyville, Ill.

TORQUE CONVERTER DRIVE

More Efficiency — Engine operates at most efficient speeds — no laboring or stalling
Lower Maintenance — Oil cushion absorbs load shocks — protects vital parts
Easier Operation — Eliminates much gear-shifting and "clutching"
Greater Output — Operates at highest speed in relation to load

SAY HUFF

PAYLOADER®

Chicago. A graduate of Yale University, he joined the firm in 1930 as an apprentice and has held various positions in sales and production since.

Mr. Crocombe, a graduate of the University of Illinois, joined the company in 1937 as an operating trainee. He was formerly district sales manager in St. Louis, and prior to that had held various production and administration positions in the division. He will be located at the Amsco plant in Chicago Heights, Ill.

Mr. Baker, formerly a sales engineer with Amsco, joined the company in 1947, after his graduation from the U. S. Naval Academy at Annapolis. His office will be located in St. Louis.

R. E. Schatmeyer has been made sales manager and **John J. Schneider,** sales representative, for the **Stanley H. Smith Company** at Cleveland.

Mr. Schatmeyer has been with the firm since 1939 as office manager and sales coordinator, except for four years which he spent in the Air Force during World War II.

Mr. Schneider was formerly with the Terminal Supply Company where he spent eight years in railroad sales work.

Floyd O. Johnson, Jr. has been appointed railroad sales engineer for the **Colorado Fuel & Iron Corp.,** Railroad Sales Department, at Denver.

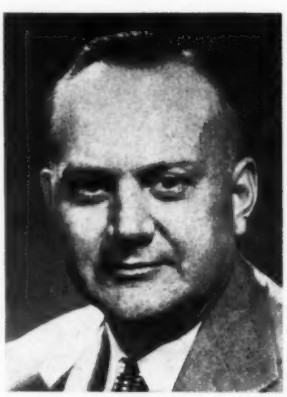
William J. Klein has been named vice-president and general sales manager of

William J. Klein

the Tractor Division of the **Allis-Chalmers Manufacturing Company.**

W. E. Hendricks has been named domestic sales manager for the **LeTourneau-Westinghouse Company,** succeeding **H. R. Powers,** who has resigned. **Lloyd Rager** has been appointed sales promotion manager.

Mr. Hendricks, who had served as assistant to the general sales manager since June, came to LeTourneau-Westinghouse



W. E. Hendricks

from the A. T. Green Machinery Company in Pittsburgh where he served as sales manager. He had previously spent 11 years with the LaPlant-Choate Manufacturing Company and was assistant sales manager when he left in 1949. He also served with the Caterpillar Tractor Company for several years.

Mr. Rager, formerly assistant advertising manager, has been with the company for 17 years. In his new position he will provide promotional and merchandising help to the distributor organization.

R. J. Marschalk, district sales manager at San Francisco, has been appointed Chicago district sales manager for the

(*Continued on page* 78)

Supply Trade News (Cont'd)

Homelite Corporation at Melrose Park, Ill., and **R. S. Kennedy** has been named manager of the Melrose Park branch office.

Mr. Marschalk began his service with Homelite in 1933 and has progressed upward through the sales and service department to his new position where he will be responsible for supervision of Homelite field representatives in Milwaukee, Bloomfield, Ill., and Melrose Park, as well as for operations of the district sales office.

Mr. Kennedy, formerly branch manager at Fresno, Calif., will be in charge of all local sales in the Chicago area.

Walter W. Stake has been named regional manager of the Eastern district, and **Allen O. Dragge** becomes regional manager of the Pacific Coast district, for the **A. O. Smith Corporation.**

Mr. Stake, formerly assistant general sales manager for the Permaglas-Heating Division, has been with A. O. Smith since 1945. He succeeds the late Russell J. Irish as head of the New York office.

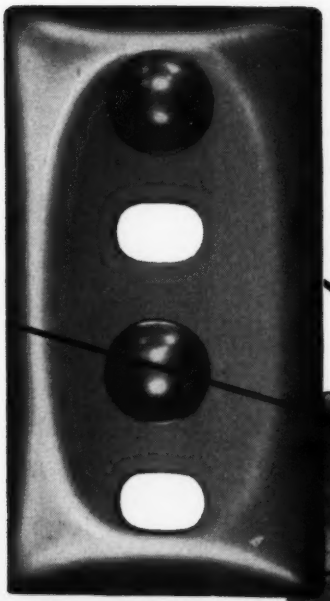
Walter W. Stake

Allen O. Dragge

Mr. Dragge, who was with Robert W. Baird & Co., Inc., Milwaukee, before joining A. O. Smith in 1947, has held several positions of increasing responsibility in the west coast territory.

(*Continued on page* 80)

protection doubled and redoubled



TYLIFE—A new treatment for spike holes—hardens the walls of the hole and bonds the spikes or tie plugs to the tie.

Trackmen know that unprotected Switch Rail Points wear "knife sharp" quickly in busy yards.

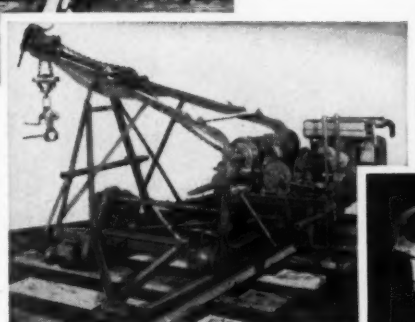
That's why many railroads have standardized on the use of *Mack Switchpoint Protectors.* They shift the wheel flanges away from the *point* and transfer the wear to the thicker portion of the switch rail.

The first application of the *Mack Switchpoint Protector* lengthens switch rail life up to four times. The *Mack* is then removed, reversed, and reapplied to extend total switch rail life up to eight times that of an unprotected rail — thus saving switch rail cost and the labor of many re-applications.

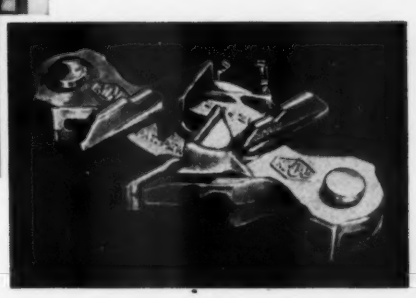
Maintenance Equipment Company

RAILWAY EXCHANGE BUILDING • CHICAGO 4, ILLINOIS

MECO CURVE RAIL LUBRICATOR—Lubricates wheel flanges on curves, increases safety of train operation, prolongs life of wheels and rails.



MECO POWER RAIL LAYER—Takes the labor out of rail lifting. Picks up rails and "lays 'em down" with little or no hard labor.



RYD-IN AUTOMATIC COUPLER—For securely coupling motor cars and trailers.

R-190R

Supply Trade News (Cont'd)

Richard C. Newth has been appointed supervisor, sales and service, Eastern Railroad Division of the **Dearborn Chemical Company. Herbert G. Mastin,** assistant vice-president, Eastern Railroad Division, has been placed on a semi-retirement status at his own request.

Mr. Newth began service with Dearborn in 1944 as a service engineer, following five years service with the Boston & Maine. Subsequently, he received promotions to assistant chief engineer and

Richard C. Newth

special engineer. He was holding the latter position at the time of his recent appointment.

Mr. Mastin requested that he be put on a limited service basis due to recent illness. He will continue to represent Dearborn in New England to the extent that his health will permit.

Paul S. Settle has been appointed vice-president of the **Railway Maintenance Corporation.** A graduate of Lehigh University, Mr. Settle was formerly a divi-

Paul S. Settle

sion engineer for the Pennsylvania, with which company he had been associated for 17 years.

E. A. Steidl has left the Grating Division of the **A. O. Smith Corporation** to assume Welding Products Division sales for southern Wisconsin and part of Milwaukee. **Warren Ware** has been trans-

(Continued on page 82)

Partners in Perfection

Precise railroading is no longer a novelty—it's a necessity! Especially in track. But long before high speeds made equal bolt tension and a minimum of expansion, contraction and the elimination of creepage mandatory, the World's Finest Spring Washer, and the World's Most Powerful Rail Anchor were being teamed by precise railroaders to achieve the track perfection so necessary today.

THE VERONA *FIXED* TENSION TRIFLEX SPRING

The only device of its kind providing sufficient bolt tension without going flat —and the means to provide **equal** tension in all bolts. It has the **highest** reactive pressure—**twice** the A.R.E.A. specifications —of any spring washer—"The World's Finest Spring Washer!"

THE *ADVANCED TYPE* WOODINGS RAIL ANCHOR

Millions of these anchors are in service today—and **re-service,** too—because it has the highest re-application value of any rail anchor manufactured—ask your branch line supervisor! One piece, two equal grip jaws, four equally-spaced contacts between anchor and rail enabling anchor to adjust itself to tolerances in rail base dimensions—"The World's Most Powerful Rail Anchor!"

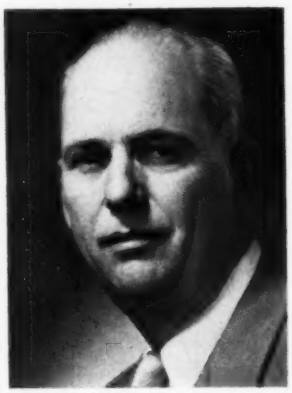
Woodings FORGE & TOOL CO.
Woodings-Verona TOOL WORKS
Chicago • VERONA PA • St. Louis

Supply Trade News (Cont'd)

ferred from accessories' sales to cover northern Wisconsin and the remaining portion of Milwaukee. **M. A. Ockerman,** formerly with Arms Franklin Corporation, has assumed the territory at Canfield, Ohio, and **R. H. Schradiek** has taken over the territory at Boston, Mass. **E. W. Olds** has been appointed at Oakland, Calif., to cover the Bay area. The **Los Angeles** territory will be handled by **Richard Terry,** who was transferred from the Electric Motor Division to the Welding Products Division.

Walter B. Templeton, founder and formerly chairman of the board of **Templeton, Kenly & Co.,** died at Hinsdale, Ill., on December 6. A native of Chicago, Mr. Templeton formed the jack manufacturing company in 1899 with the late W. K. Kenly, and served as president of the firm until 1939 when he was named chairman of the board.

Albert F. Huber, chief engineer of the **Ramapo Ajax Division** of the **American Brake Shoe Company,** has been named vice-president in charge of engineering, and Fred W. Creedle, formerly assistant chief engineer maintenance of way of the



Fred W. Creedle

Albert F. Huber

Chicago & North Western, has been appointed chief engineer succeeding Mr. Huber.

Mr. Huber started with the company as a draftsman in 1906, and held various

engineering positions in the division until he was appointed chief engineer in 1936.

Mr. Creedle began his railroad service in 1922 with the Illinois Central, and held various engineering positions there and with the North Western before being named assistant chief engineer maintenance of the North Western.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 69.)

Calrod Heating—the 1954 edition of the General Electric Company's catalog on Calrod electric heating devices is now available. The 60-page, two-color catalog, designated as GEC-1005E, describes the heating units in terms of application, special features, installation, and pricing. The booklet contains photographs and drawings to illustrate the various products, including immersion, strip, cartridge, tubular, insertion, and fin heaters; melting pots, thermostats, switches, and oven heaters. In addition, methods for determining power requirements and heat losses are presented. The catalog is indexed by processes and applications and, as a special feature, an index of industrial heating application bulletins, and data and specification sheets, is included.

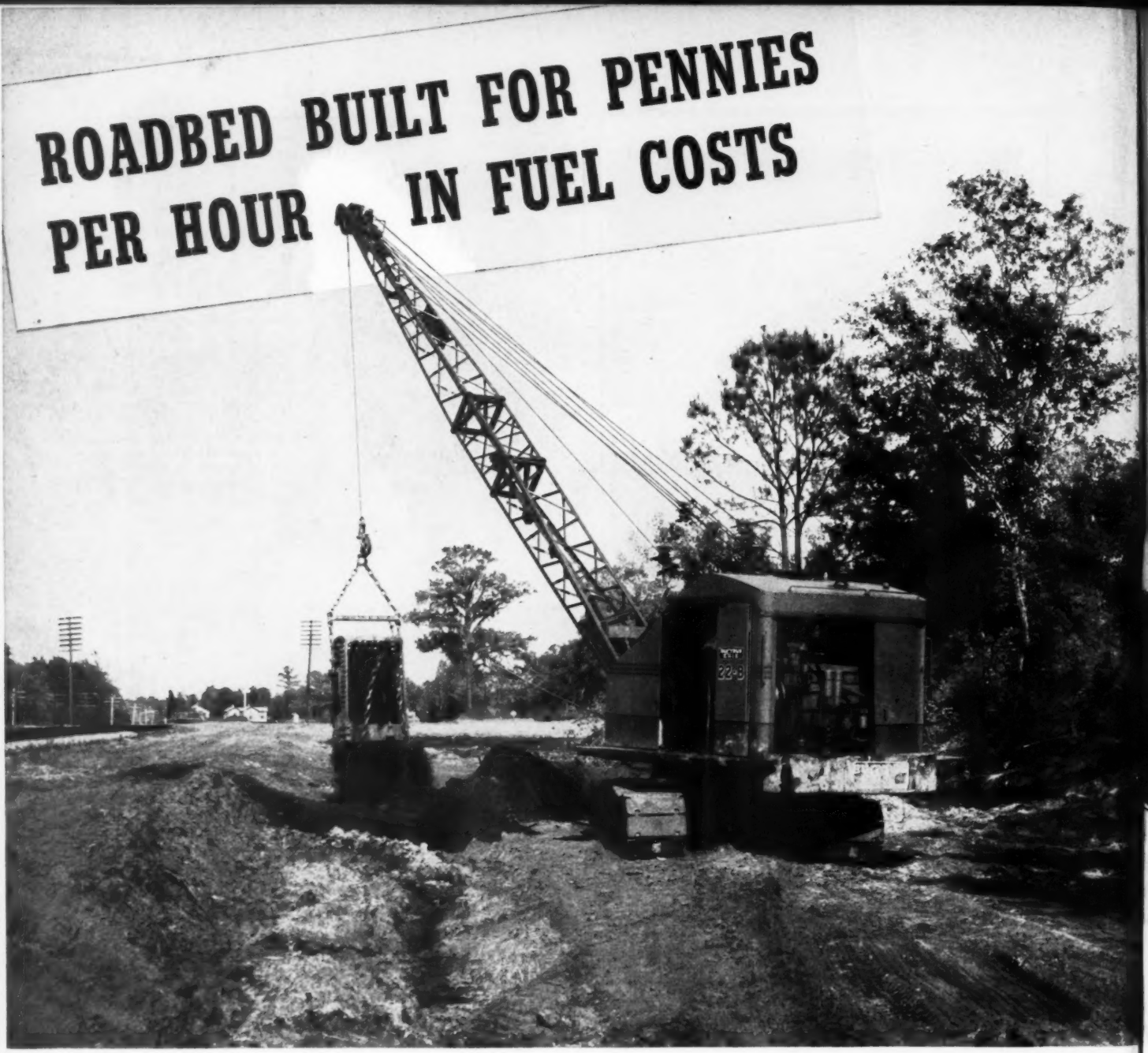
Aluminum Siding and Roofing—The Aluminum Company of America has issued a new booklet, "Alcoa Aluminum Corrugated Industrial Roofing and Siding," which describes in detail, with comprehensive drawings, methods of applying Alcoa roofing and siding. The 16-page booklet includes detailing of fasteners and accessories, loading and weight-coverage tables, and roofing and siding details on basic types of industrial structures. Construction of an insulated wall made from a combination of two layers of corrugated aluminum with a center of insulating material is also outlined.

Stud Drivers—A new four-page, illustrated bulletin describing details of design, operation, and applications for its Model "P" driver has been published by the Velocity-Power Tool Company. The pamphlet includes drawings and action pictures showing how the tool is used to fasten steel to concrete, wood to concrete, and steel to steel, and to penetrate steel and concrete. A list of the applications of the tool is also given. A section of the tool itself is presented, together with operating features and instructions.

Air Compressors—To aid buyers in selecting an air-compressor unit most suitable for their requirements, the Binks Manufacturing Company has introduced a new and comprehensive catalog covering its complete line of air compressors. The 16-page booklet includes 27 sizes and 5 types of units in single or two-stage tank-mounted types, from ¾ hp. to 15 hp.—single or two-stage, base mounted, from ¾ hp. to 20 hp.—and portable single-stage with capacities from 2.2 cfm. to 105 cfm. The catalog also calls attention to many new operating and mechanical features of the new line of compressors.

Advertisers IN THIS ISSUE

ROADBED BUILT FOR PENNIES PER HOUR IN FUEL COSTS



THIS Bucyrus-Erie Shovel is building profits as well as roadbed for the Atlantic Coast Line Railroad. A money-saving Cat* D318 Diesel Engine is powering its ¾-yard bucket.

Like all dependable Caterpillar Diesels, the D318 operates on inexpensive No. 2 furnace oil, and uses it sparingly. Fuel cost is measured in pennies!

But Caterpillar Diesel Engines pay off in more than fuel economy. Their high availability and long life add up to big dollar savings. Costs drop if equipment is ready for work when your men are—and that's the type of availability you can count on from Caterpillar off- and on-track equipment.

In addition, you can get genuine Cat parts within a matter of hours from your nearby Caterpillar Dealer. He will go anywhere, at any time. He always keeps parts in stock for your equipment. And no matter how old your Caterpillar equipment may be, it never becomes an orphan. Parts are available—*always.*

So cut down your parts inventory problem the next time you order new equipment or the next time you repower. Specify Caterpillar power. Leading manufacturers of railroad and construction equipment can supply it.

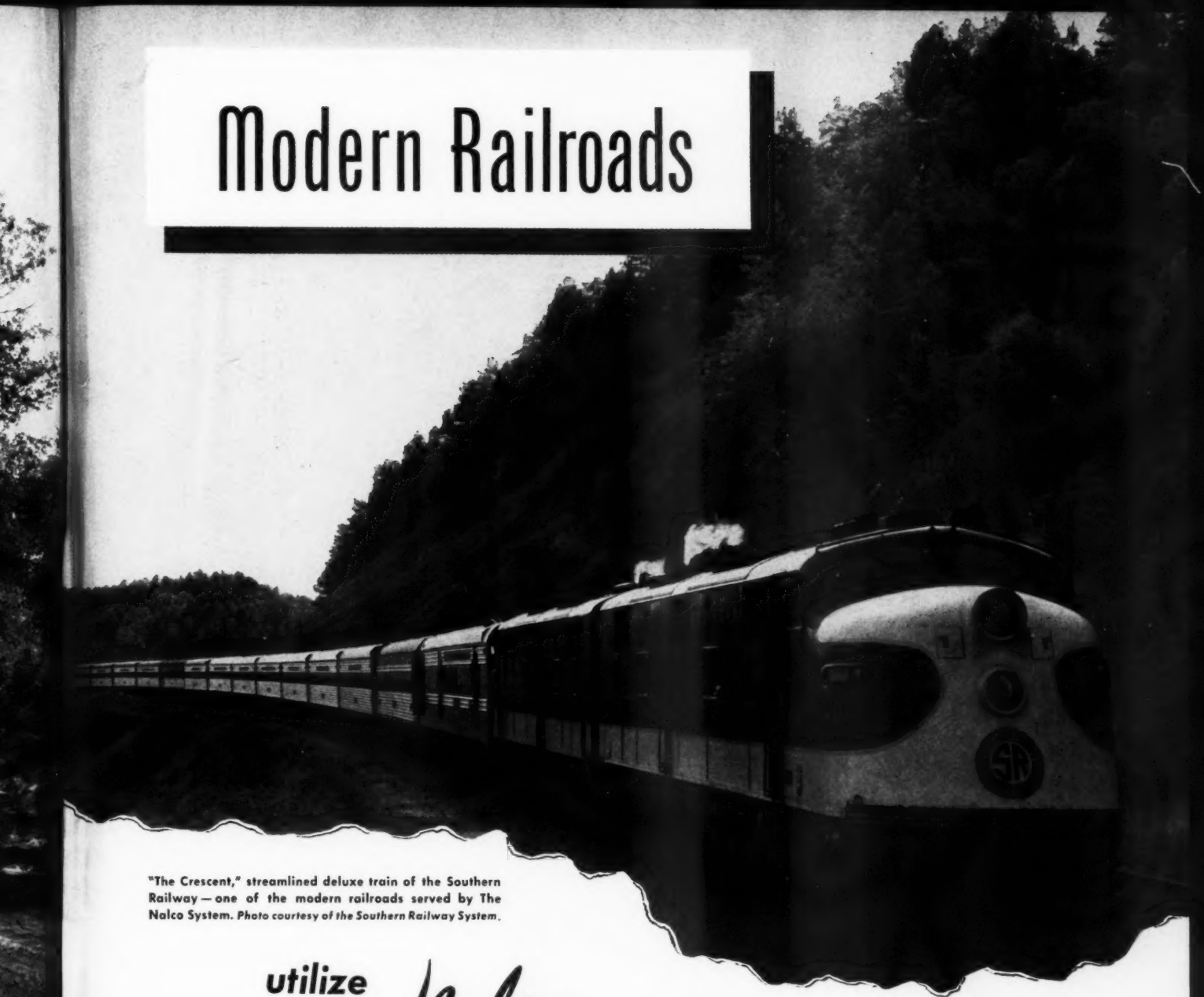
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

SPECIFY CAT POWER FOR HIGH-PROFIT PERFORMANCE

Modern Railroads



"The Crescent," streamlined deluxe train of the Southern Railway—one of the modern railroads served by The Nalco System. *Photo courtesy of the Southern Railway System.*

utilize MODERN *Nalco* MATERIALS and SERVICES

"THE Southern Serves the South"—and Nalco serves the Southern. It is a great satisfaction to have had, and to continue to have a small part in the excellent modernization and performance record of the Southern Railway System.

During the past year, thirteen different Nalco formulas were in use by the Southern. These included several different internal boiler water treatment materials, feedwater stabilizers, stationary boiler feedwater treatments, diesel cooling water treatment, and diesel steam generator treatment . . . all modern Nalco materials, backed by Nalco service to insure best field results.

NATIONAL ALUMINATE CORPORATION
6196 West 66th Place Chicago 38, Illinois
In Canada: Alchem Limited, Burlington, Ontario

THE *Nalco*® SYSTEM . . . Serving Railroads through Practical Applied Science

TIES LAST MUCH LONGER

...when protected with TEXACO TEXTICOTE

Now, you can assure much longer tie life —easily, quickly and at very low cost. Simply brush or spray on *Texaco Texticote* and cover with ¼" crushed stone.

Texaco Texticote is an extremely durable asphaltic coating that keeps moisture out of the wood, preventing cracking and splitting. *Texaco Texticote* will not check or crack, will not become brittle, chip or peel off. Actual railroad experience proves its economy in prolonging tie life.

Let a Texaco representative give you full information. Just call the nearest Railway Sales Office in New York, Chicago, San Francisco, St. Paul, St. Louis or Atlanta; or write The Texas Company, *Railway Sales Department*, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Railroad Lubricants

AND SYSTEMATIC ENGINEERING SERVICE

IN ALL 48 STATES

TUNE IN . . . METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.